

4-2015

## **Somatization in the Social Environment: Relations to Victimization and Friendship Processes Among Middle School Students**

Naomi J. Parr  
*College of William and Mary*

Follow this and additional works at: <https://scholarworks.wm.edu/honorstheses>



Part of the [Child Psychology Commons](#), [Clinical Psychology Commons](#), [Developmental Psychology Commons](#), [Health Psychology Commons](#), [Mental Disorders Commons](#), [Pain Management Commons](#), [Psychiatric and Mental Health Commons](#), and the [Psychological Phenomena and Processes Commons](#)

---

### **Recommended Citation**

Parr, Naomi J., "Somatization in the Social Environment: Relations to Victimization and Friendship Processes Among Middle School Students" (2015). *Undergraduate Honors Theses*. Paper 115.  
<https://scholarworks.wm.edu/honorstheses/115>

This Honors Thesis is brought to you for free and open access by the Theses, Dissertations, & Master Projects at W&M ScholarWorks. It has been accepted for inclusion in Undergraduate Honors Theses by an authorized administrator of W&M ScholarWorks. For more information, please contact [scholarworks@wm.edu](mailto:scholarworks@wm.edu).

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

**Somatization in the Social Environment: Relations to Victimization and Friendship Processes Among Middle School Students**

A thesis submitted in partial fulfillment of the requirement for the degree of Bachelors of Science in Psychology from The College of William & Mary

by

Naomi J. Parr

Advisor: Janice L. Zeman

Accepted for Honors  
(Honors)  
Janice L. Zeman  
Janice L. Zeman, Chair  
Catherine Forestell  
Catherine Forestell  
Beverly Sher  
Beverly Sher

Williamsburg, VA  
April 30, 2015

### Abstract

Aversive peer experiences, such as overt and relational peer victimization, have been shown to predict somatic symptoms in early adolescents (Nixon, Linkie, Coleman, & Fitch, 2011). Few studies, however, have assessed somatic symptoms in the context of positive social relationships, such as peer friendships. The present study examined relations between somatic symptoms and both negative and positive friendships to determine whether friend support may buffer youth against somatic symptoms. Data were collected from 200 youths enrolled in middle school ( $M_{age} = 12.66$ , 53.0% female, 75.5% White), who responded to questions assessing friendship quality with a reciprocated mutual best friend, victimization experiences, emotion talk, co-rumination, and somatic symptoms. Mothers also reported on their child's somatic symptoms. Multiple regression analyses demonstrated that overt victimization and relational victimization predicted higher somatic symptoms, particularly among girls. Actor-Partner Interdependence Modeling (APIM; Kenny, Kashy, & Cook, 2006) was used to analyze dyadic data from youths' reports about their best friendships. Friends' perceived unsupportive responses to emotion predicted higher somatic symptoms, whereas positive features of best friendships, including instrumental help, validation, conflict resolution, and supportive responses to emotion predicted fewer somatic symptoms. Findings with validation, conflict resolution, and emotion talk were more evident for girls than boys. These findings emphasize the need to examine further both positive and negative peer relationships as antecedents or outcomes associated with somatization.

*Keywords:* somatization, somatic, friendship, middle school, victimization

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

## Acknowledgements

I wish to express my sincerest thanks and heartfelt appreciation to all of the people who have helped to make this project a success. I offer special thanks to my research advisor and principle investigator, Janice L. Zeman, Ph.D., whose mentorship has been invaluable to me. I am so grateful for Dr. Zeman's patient instruction, professional guidance, and encouragement, which have allowed me to become a better researcher and person. I would also like to extend special thanks to my honors committee members, Beverly Sher, Ph.D. and Catherine Forestell, Ph.D., who have both individually contributed to my growth as a scientist. My sincere gratitude goes out to professors William Buchser, Ph.D. and John Nezlek, Ph.D. for their advice regarding the complex statistics involved in this project, as well as to Sarah Borowski, M.S. who took the time to teach and oversee all of the analytics use in this study. Added thanks go to Kara Braunstein, B.S. and the Social and Emotional Development Lab for their support and assistance with the collection of these data. I would also like to convey my appreciation to the William & Mary Charles Center and the Department of Psychology for their financial backing of this project. Finally, my deepest appreciation goes out to my friends and family for their continual support throughout this process.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

## Table of Contents

	Page
Introduction.....	5
Somatization.....	5
Mechanisms Underlying Somatization.....	8
Peer Relationships and Somatic Complaints.....	10
Peer Friendships.....	13
Peer Friendships' Role in Stress Reduction.....	13
Adaptive Socioemotional Processes Within Peer Friendships.....	15
Maladaptive Socioemotional Processes Within Peer Friendships.....	17
Study Goals & Predictions.....	20
Method.....	22
Participants.....	22
Materials.....	23
Problem Talk Discussion Task.....	28
Behavioral Coding.....	28
Procedure.....	29
Results.....	32
Analytic Strategy.....	32
Risk Experiences.....	34
Buffering Experiences.....	36
Co-rumination.....	37
Discussion.....	38
Risk Experiences.....	39
Buffering Experiences.....	42
Co-rumination.....	45
Limitations and Future Directions.....	46

## Somatization in the Social Environment: Relations to Victimization and Friendship Processes Among Middle School Students

### **Somatization**

Somatization is the manifestation of psychological distress as physical symptoms such as headaches, stomachaches, body aches, dizziness, and fatigue (Mai, 2004; Taylor, Szatmari, Boyle, & Offord, 1996). These somatic complaints generally cannot be traced to any diagnosable medical conditions, however they are not fictitious and may be explained by biological mechanisms involved in the stress response as well as by changes in individuals' perception of pain (Garber, Walker, & Zeman, 1991; Mai, 2004; Rief, Hennings, Riemer, & Euteneuer, 2010). Somatic disorders account for more productivity loss, unemployment, and healthcare usage than any other psychiatric disorder, indicating the need for further research into its many predictors and causes (Mai, 2004; Poikolainen, Aalto-Setälä, Marttunen, Tuulio-Henricksson, & Lonnqvist, 2000; Rief & Auer, 2000). Among adults, somatizing disorders appear to be slightly more prevalent among women, with an estimated lifetime prevalence of 0.2%-2%, compared to 0.2% among men (Mai, 2004).

Somatizing symptoms are very common among children; however, excessive somatizing constituting clinical psychopathology is less common (Campo & Fritsch, 1994). Even sub-clinical somatizing adversely affects multiple domains of children's health including psychological, biological, and social well being (Beck, 2008; Rhee, Holditch-Davis, & Miles, 2005; Taylor, 1996). Using the DSM-III criteria, Offord and colleagues (1987) found the estimated prevalence of somatic symptom disorders (SSDs) among a general population of 12-16 year old adolescents to be 10.7% of girls and 4.5% of boys. A later population study by

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Eminson, Benjamin, Shortall, Woods, and Faragher (1996) found that 8.3% of adolescents ages 11 to 16 years met the DSM-III criteria for an SSD. However, as many as 15.2% of youth ages 7-18 years may present with recurrent somatic complaints to a degree that hinders daily functioning (Garber et al., 1991). The symptoms most commonly reported by middle to late adolescents age 12-18 are headache (29%), body ache (27%), fatigue (21%), and stomachache (18%) (Rhee et al., 2005).

Somatizing symptoms present in childhood show considerable stability (Poikolainen et al., 2000; Ruchkin & Schwab-Stone, 2014). Studies have found that somatic symptoms appearing as early as 3 years of age predict somatic complaints later in childhood (Pihlaoski et al., 2006), and are often associated with sleep disturbance, (Simola, Liukkonen, Pitkäranta, Pirinen, & Aronen, 2014). In a 9-year longitudinal study of 3-year old children, Pihlakoski and colleagues (2006) found that somatic symptoms at age 3 years predicted somatic symptoms at age 12 among boys, and predicted both somatic complaints and other internalizing disorders (anxiety, depression) at age 12 among girls. Another longitudinal study discovered that somatic symptoms in high-school age boys and girls predicted the same level of symptoms in each gender five years later. For women only, somatization in adulthood was related to the number of negative life events experienced since adolescence (Poikolainen et al., 2000).

Girls tend to report greater frequency and severity of somatic symptoms than boys (Eminson et al., 1996; Wangby, 2000), although this gender effect does not emerge until early adolescence when physical symptoms peak for both genders (Rhee, 2003). In a cluster analysis of data from 9,141 children from the National Longitudinal Study of Adolescent Health (Add Health) in grades 7 through 12, Rhee and colleagues (2005) found that girls were significantly more likely to be characterized by “high” or “extreme” symptom clusters, which included

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

individuals who reported 10 somatic complaints at a higher than average frequency. However, the stability of symptoms from childhood to adolescence was lower in girls than in boys. Rhee (2003) proposed that the observed differences in symptom frequency and severity between boys and girls may be due to hormonal changes associated with pubertal development or the relatively greater psychosocial stress related to puberty in girls during this developmental stage. Other suggested explanations include differences in pain perception, differences in symptom reporting, and differences in socially acceptable reactions to pain (Poikolainen et al., 2000, Rhee, 2003).

Youth in middle adolescence report greater somatizing than both younger children and older adolescents and their symptoms show greater stability over time (Rhee, 2003; Rhee et al., 2005; Wangby, 2000). Somatic symptom disorders among children are especially common in low socioeconomic status (SES) communities, non-White ethnicities, and victims of childhood trauma or victimization, (Bailey, 2005; Reynolds, O'Koon, Papademetriou, Szczygiel, & Grant, 2001; White & Farrell, 2006), though there may be important differences in the types of symptoms reported by different racial and ethnic groups (Kingery, Ginsburg, & Alfano, 2007). For example, Rhee (2003) notes that rates of headache, body ache, and dizziness are higher in Caucasian populations, whereas urinary dysfunction, cold sweat, overheating, and chest pain are more common among African Americans. Rhee (2005) proposes that the ethnic disparity associated with these symptoms can, at least in part, be attributed to lower SES and higher rates of depressive symptoms among racial minorities, whereas, other symptoms may occur regardless of SES or comorbid depression.

Somatic symptom disorders are highly comorbid with other internalizing disorders in adults (Mai, 2004), and somatic complaints are frequently reported with symptoms of depression and anxiety among children and adolescents (Dhossche, Ferdinand, van der Ende, & Verhulst,



## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

2001; Garber et al., 1991). The most overlap occurs between SSDs and depression, with up to 75% of individuals with depressive disorders reporting somatic complaints (Kellner, 1990; Lavigne, Saps, & Bryant, 2014; Rief et al., 2010). However, that is likely due to the overlap between constructs. That is, some somatic complaints such as fatigue and appetite changes are included in the diagnostic criteria for depression (Kovacs, 1992).

Anxiety disorders also share diagnostic criteria with SSDs, including dizziness, stomachache, and body aches (March, Parker, Sullivan, Stallings, & Conners, 1997), which may explain the observed comorbidity of SSDs with Generalized Anxiety Disorder (GAD) and Panic Disorder (PD) in adults (Barbee et al., 1997). The same co-occurrence of anxiety symptoms and somatic complaints can be seen in youth, though it remains unclear whether the somatic complaints present in anxious youth result from somatization. Among children ages 8-14, Hughes, Lourea-Waddell, and Kendall (2008) found that somatic symptoms were reported more frequently by highly anxious children than by non-anxious individuals. Among adolescents ages 14-19, Kingery and colleagues (2007) found that somatic symptoms correlated significantly with anxiety symptoms. Despite the overlap of symptoms, measures of somatic complaints often correlate with depression and anxiety symptoms even with shared items removed; thus, they remain separate but related constructs (Garber et al., 1991; Vernberg, 2011).

### **Mechanisms Underlying Somatization**

The stress response is implicated as the biological mechanism underlying somatization (Mai, 2004; Rief et al., 2010; Verkuil, Brosschot, Gebhardt, & Thayer, 2010). The literature base on the relation between stress and somatization is vast and complex, but all studies similarly emphasize that prolonged exposure to acute stressors predicts overactivation of the hypothalamic-pituitary-adrenal (HPA) axis, irregular reactivity of the hormone cortisol, and

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

inappropriate response of the pro-inflammatory immune system (Rief & Auer, 2000; Rief et al., 2010; Zoccola & Dickerson, 2012), causing an increase in somatic complaints (Mai, 2004; Uchino, Cacioppo, & Kiecolt-Glaser, 1996).

The HPA axis works in conjunction with the sympathetic nervous system (SNS) to regulate the stress response (Bauer, Quas, & Boyce, 2002; Gunnar, 1992). The hypothalamus triggers release of stress hormones such as cortisol and norepinephrine from the pituitary and adrenal glands, respectively. These hormones then act on nearly every body system in preparation for an acute stressor (Brosschot, Gerin, & Thayer, 2006; Rief & Auer, 2000). HPA activation is a normal component of the human fight-or-flight response; however, excessive activity due to chronic stress may contribute to a variety of internalizing disorders and somatic symptoms (Byrd-Craven, Granger, & Auer, 2010; Vitiliano et al., 2002; Wingenfeld et al., 2008).

Rief and colleagues (2010) suggest that exhaustion of resources from chronic stress leads to inappropriate cortisol reactivity to stress, an excess of uninhibited pro-inflammatory cytokines in the body, and a reduction of analgesia – all of which may contribute to somatic symptom reporting. Rief's theory resembles Hans Selye's General Adaptation Syndrome model of chronic stress, wherein the physical effects of chronic stress are explained by the body's depletion of its physiological resources (Selye, 1950). Rief's cortisol reactivity model is also consistent with recent findings that victimized children exhibit abnormal cortisol reactivity to stress, rather than just abnormally high or low cortisol levels (Ouellet-Morin et al., 2011; Rudolph, Troop-Gordon, & Granger, 2010), and that receptors for cortisol and other glucocorticoids show resistance to binding in chronically stressed individuals (Cohen et al., 2012; Miller, Cohen, & Ritchey, 2002).

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Unsurprisingly, chronic stress and frequent exposure to traumatic events strongly predict somatization in both children and adults (Bailey et al., 2005; Mai, 2004; Reynolds et al., 2001). However, even stress-related cognitive processes appear to predict somatization in many youths (Flett, Molnar, Nepon, & Hewitt, 2012). In a longitudinal study of adolescents ages 16-17, Brosschot and van der Doef (2006) found that excessive worry predicted increased somatic complaints, and that a worry reduction intervention could decrease these complaints. Eminson and colleagues (1996) found that girls ages 11-16 who reported an excess of somatic symptoms also scored higher on measures of illness-related distress. Vervoort and colleagues (2006) found an association between somatic symptoms and catastrophic cognition in school age children. Other studies have found that negative rumination and poor self-esteem among children and adolescents predicts increases in somatic complaints (Jellesma, Rieffe, & Terwogt, 2008; Miers, Rieffe, Terwogt, Cowan, & Linden, 2007; Thomsen et al., 2002). Despite the vast body of research investigating the role of stress and worry in somatization, little research has explored somatization in the context of children's friendships.

### **Peer Relationships and Somatic Complaints**

As peer relations comprise a large portion of early adolescents' daily life (Kingery, Erdley, & Marshall, 2011), and the risk for internalizing psychopathology increases, particularly among girls, in adolescence (Kingery et al., 2011), it is pertinent to study the unique associations between youth's peer experiences on somatic health. Much of the existing research has focused on the negative health outcomes associated with peer victimization, with little investigation of other peer relationships (e.g., friendships) that may ameliorate or buffer against somatic complaints. Numerous studies have found that peer victimization significantly predicts increased somatizing in children and adolescents (Gini Carli, & Pozzoli, 2009; Nishina, Juvonen, &

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Witkow, 2005; Nixon, Linkie, Coleman, & Fitch, 2011). Childhood victimization has also been shown to predict significant changes in cortisol reactivity including an overactive stress response (Ouellet-Morin et al., 2011; Rudolph et al., 2010).

Types of peer victimization may differentially contribute to somatization in youth. Nixon and colleagues (2011) found that relational victimization, which is aggression using verbal or social means such as gossip and exclusion, is a stronger predictor of somatic complaints than physical victimization among both adolescent girls and boys. Similarly, Nishina and colleagues (2005) found that peer victimization predicted increased somatization in middle school students, while controlling for depression and anxiety symptoms. Some studies report that the relation between victimization and somatic complaints may be mediated by both physical and verbal aggression, with nonaggressive victims of peer hostility presenting most frequently with illness (Nixon et al., 2011; Vernberg et al., 2011).

Even interpersonal stress not due to victimization is associated with somatic complaints in children and adolescents. Peer stress, described by Hart and colleagues (2013) as child report of a recent fight with a peer or a friend failing to keep a secret, was significantly associated with somatic symptoms. Murberg and Bru (2004) similarly found a relation between somatic complaints among adolescents and interpersonal conflict at school, including conflict with friends, not having many friends, or not seeing friends outside of the school environment.

Processes that occur within friendships may uniquely influence somatization, though few studies have gone into more detail than vague descriptions of interpersonal conflict, without examining other dyadic activities. One such process that has received little attention is co-rumination, defined as dyadic and mutually encouraged focus on negative aspects of personal problems (Rose, 2002). Co-rumination is characterized by excessive problem talk, rehashing

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

problem details, speculating about problem elements, mutual encouragement of problem talk, and negative affect focus (Rose, Carlson, & Waller, 2007). It is differentiated from the strictly cognitive process of rumination, by its social, inter-personal nature, as well as by its tendency to yield paradoxical outcomes. Rose and colleagues (2007) reported that while co-rumination is associated with internalizing symptoms in children and adolescents, it also predicts increases in friendship quality, which itself is associated with health benefits (Uchino et al., 1996). The beneficial health effects of peer friendships and the transactional nature of co-rumination will be discussed in more detail in the next section.

In addition to peer processes that predict increases in somatic symptoms, some constructs may buffer the effect of somatizing, such as emotional support and positive friendship quality (Gini et al., 2009; Johnson, 2004; Ladd, Kockenderger, & Coleman, 2008). Mere participation in mutual friendships has pronounced effects on youth's emotional well-being and prevention of loneliness, with other adaptive outcomes mediated by friendship quality and friends' characteristics (Vitaro, Boivin, & Bukowski, 2009). The positive effects of high quality friendships include improved academic performance (Ladd et al., 2008), reduction of the effects of family and peer victimization (Bollmer et al., 2005; Jenkins & Smith, 1990; Vitaro et al., 2009), improved self-esteem (Keefe & Berndt, 1996), prevention of internalizing psychopathology (Erdley et al., 2002; Vitaro et al., 2009), and reduction of stress (Windle, 1992). Moreover, having one or more quality friendship in preadolescence predicts positive emotional adjustment in adulthood (Bagwell, Newcomb, & Bukowski, 1998).

Rhee and colleagues (2005) note that the quality of children's friendship uniquely impacts children's somatic health. In their study which utilized cluster analysis of physical symptoms among children in grades 7 through 12, they found that adolescents in the moderate to

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

extreme somatizing clusters reported a high number of friends and frequent activities with friends, but also reported “not feeling cared about” by their friends. The nonsymptomatic cluster, however, reported having fewer friends and shared activities, but high perceived friendship quality. Though this study provides new insights into the importance of friendship quality, its measure of friendship quality relied on a single-item self-report metric that could not capture the realities of adolescent friendships in more detail.

In fact, few processes within positive friendships have been explored in the context of somatization. Gini and colleagues (2009) found that peer support is negatively associated with somatic complaints, as opposed to peer victimization, which is positively associated with somatic complaints; however, peer support differs in important ways from peer best friendship. Little to no research has examined the role of supportive friendship processes in somatization, such as conflict resolution, validation, intimate exchange, instrumental help, or companionship. All of these behaviors could buffer the effects of stress on youths' somatic health.

### **Peer Friendships' Role in Stress Reduction**

It is not surprising that peer support and somatic complaints are inversely related, given the vast array of literature supporting the Stress Buffering Hypothesis of social support (Cohen & Willis, 1985; Dubow, Tisak, Causey, Hryshko, & Reid, 2008; Windle, 1992). Peer support, in particular, is a type of social support specific to youth's same-age relationships, distinct from other types of social support such as parental support (Chappel, 2013). One aspect of peer support that has been extensively studied is its ability to prevent and even ameliorate the harmful effects of peer victimization among children and adolescents (Chappel, 2013; Gini et al., 2009; Vitaro et al., 2009). These positive outcomes may be due in part to the direct effects of peers intervening in victimization. However, even perceived peer support seems to reduce stress

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

associated with victimization, thus it is hypothesized that the mere presence of supportive peers acts as a buffer (Chappel, 2013; Gini et al., 2009; Hodges, Boivin, Vitaro, & Bukowski, 1999).

In addition to buffering stress associated with peer victimization, peer support seems to alleviate family and school stress. In a study of early adolescents from homes with daily parental discord, Wasserstein and La Greca (1996) found that high peer support from close friends was associated with lower externalizing behavior than found with similarly stressed adolescents without peer support. In another study of early adolescents, peer support predicted teacher-rated academic competence, high GPA, and behavioral adjustment, even in the presence of stressful life events (Debow et al., 2008). Longitudinal and cross-sectional studies examining the relation between peer support and mental health have found that peer support is associated with lower externalizing and internalizing symptomatology, and with higher self-worth, self-esteem, and self-concept (Chappel, 2013).

The protective effects of peer support are relevant to this study; however, it is important to note that best friendship, in particular, is an especially salient form of peer support, with its own unique associations. Chappel (2013) notes that the positive effects of peer support may depend on the quality of children's friendships, such that higher quality friendships might yield greater protective effects. Wasserstein and La Greca's (1996) findings support this hypothesis, in that the relation between peer support and low externalizing behaviors only occurred with support from close friends, but not with support from classmates. La Greca and Harrison (2005) add that while social support from within close friendships is associated with psychosocial adjustment and positive self-esteem, relationships characterized by conflict, peer pressure, and exclusion are associated low self-esteem, poor academic competence, perceived distress, and internalizing symptoms.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

In order to explain how support from close friends contributes to positive psychosocial outcomes, the socioemotional processes at work within those friendships must be examined. Though mutual friendship does often appear protective, individual friendships vary widely and can be characterized by both adaptive and maladaptive processes, including companionship, validation, conflict resolution, supportive and dismissive emotion talk, negative emotion contagion, and co-rumination (Legerski, Biggs, Greenhoot, & Sampilo, 2014; Stevens & Prinstein, 2005; Rose et al., 2007). Though few of these processes have been examined in conjunction with somatization, the existing literature may shed light on the contexts within which somatization might occur.

### **Adaptive Socioemotional Processes within Friendships**

Most companionship between early adolescents occurs within same-sex friendships, and although companionship with opposite-sex peers increases in early adolescence it does not appear to diminish time spent with same-sex friends (Richards, Crowe, Larson, & Swarr, 1998). Companionship with same-sex friends remains stable throughout adolescence, though it produces the most self-reported satisfaction and friendship quality in early adolescence (Bukowski, Hoza, & Boivin, 1994; Csikszentmihalyi & Larson, 1984). Both boys and girls spend about equal amounts of time with their same-sex friends and experience comparable levels satisfaction from them (Parker & Asher, 1993); however, gender differences in motivations for companionship arise in middle adolescence. Girls report a greater desire for inclusion and affection, whereas boys report less valuing of intimacy, while still desiring company (Bakken & Romig, 1992).

Peer relationships characterized by care, support, and interest are said to have a high degree of validation (Bukowski et al., 1994). Validation is associated with general satisfaction



## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

and friendship quality in both boys and girls, though girls report more validation in their friendships than boys (Parker & Asher, 1993). This observed gender difference in validation may occur because girls tend to rely on friendships more for emotional support and maintenance of self-esteem than do boys (Kingery et al., 2011). In addition to bolstering emotional well-being, validation is also inversely correlated with loneliness (Parker & Asher, 1993), suggesting that either lonely children do not experience validation or that validation is protective against feelings of loneliness.

Conflict resolution has been found to be inversely correlated with loneliness, and predicted greater social satisfaction among middle adolescents (Parker & Asher, 1993). Similar to validation, girls report more conflict resolution than boys, and greater peer-acceptance as an outcome. Conflict is an inevitable aspect of most relationships, though friendships characterized by high levels of conflict suffer a number of negative psychosocial outcomes as earlier noted (La Greca & Harrison, 2005). Therefore, it follows that reprieve from conflict is essential to healthy relationships. However, conflict resolution yields much more adaptive outcomes among adolescents than an alternative behavior, conflict avoidance, and is also predictive of later psychological adjustment (Ubinger, Handal, & Massura, 2013).

Prosocial behavior, while scarcely studied in middle adolescence, is related to youth's friendships and later adjustment. Vitaro and colleagues (2009) report that perceived friendship quality, frequency of interaction, and friendship stability may mediate the spread of prosocial behavior among mutual friends. Moreover, youth's prosocial behaviors in early adolescence predict later prosocial behavior in middle adolescence. Prosocial behavior may facilitate academic achievement among friends (Kingery et al., 2011). In the absence of prosocial

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

behavior, deviancy and various externalizing behaviors could arise in one or both friends (Vitaro et al., 2009).

A final and particularly important social context to study among early adolescents is how they talk about emotions. At this developmental stage youth tend to turn toward peers rather than parents for discussion of personal topics and thus, it is hypothesized that peers contribute greatly to emotion socialization in adolescence (Legerski et al., 2014). Legerski and colleagues (2014) note that early and late adolescents not only disclose more to peers than to parents, they also view peers as being more supportive of emotional expression (Zeman & Shipman, 1997).

When peers engage in emotion talk, how one responds to the other's emotional expression is a critical determinant of subsequent friendship quality, emotional adjustment, and even psychosocial health (La Greca & Harrison, 2005; La Greca & Wasserstein, 1996; Zeman & Garber, 1996). Responses may be supportive or unsupportive, and overall response styles may be characterized as emotion-coaching or emotion-dismissive, respectively. Middle school youth are more likely to discuss emotions with supportive than non-supportive peers (Legerski et al., 2014), and significantly less likely to display negative emotion to peers when an unsupportive response is expected (Zeman & Garber, 1996).

Emotion talk is more common among girls than boys, and girls use more emotion terms than boys when discussing problems (Legerski et al., 2014). These gender differences may be explained by findings that boys expect to receive less support for negative emotional displays than girls (Klimes-Dougan et al., 2014; Zeman & Shipman, 1997). However, Legerski and colleagues (2014) found that although boys use fewer emotion terms during problem talk than girls, their emotion-words to overall-words-spoken ratio is equivalent to that of girls, suggesting that the common perception of diminished emotion talk among boys may be in error.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

### **Maladaptive Socioemotional Processes within Friendships**

Even among high quality friendships, maladaptive processes may occur that influence youth's emotional and somatic health. Maladaptive socioemotional processes common to early adolescent friendships include dismissive responses during emotion talk and negative emotion contagion. Additionally, the process of co-rumination is hypothesized to facilitate the spread of emotions, and as mentioned earlier is associated with *both* positive and negative outcomes (Rose et al., 2007). Thus, there are also relevant transactional processes occurring that cannot be clearly classified as either adaptive or maladaptive.

Dismissive responses to friends' emotional expression have been hypothesized to predict poor emotional outcomes (Legerski et al., 2014). In Legerski and colleagues' (2014) study of emotion talk during a problem task, girls responded to emotional expression with dismissive responses more frequently than boys did; however, girls also used more emotion terms – both positive and negative – and talked for longer. Dismissive responses in parent-child interactions predict poor psychosocial outcomes (Zeman, Cassano, Perry-Parrish, & Stegall, 2006); however, these associations have not been as clear among peers. Legerski and colleagues (2014) hypothesize that dismissive responses among friends could often be interpreted as “playful banter,” and not produce the same distress as parental dismissing responses. Therefore, youths' perceptions of their friends' responses to emotion and whether or not their friends' actions are interpreted as supportive or unsupportive may be more relevant than the overt behaviors themselves.

Support for this hypothesis exists in a longitudinal study of youths ages 11-17 by Klimes-Dougan and colleagues (2014). They found that youths' perceptions of their friends' responses to emotion display differentially predicted internalizing and externalizing symptoms two years

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

later. The types of perceived emotion response strategies measured were based on emotion socialization behaviors identified by Magai (1996), including emotion rewarding, overriding, magnification, neglect, and overt or relational victimization (Klimes-Dougan et al., 2014; Magai, 1996). Emotion rewarding behaviors facilitate emotional understanding and coping. Emotion overriding behaviors include attempts to distract another from their unpleasant emotions. Emotion magnification encourages further emotional expression among both friends. Finally, overt and relational victimization, in this context, involves ridicule or exclusion of another for their emotional display.

Klimes-Dougan and colleagues (2014) found that a friend's perceived emotion neglect predicted internalizing and externalizing symptoms two years later among girls. Perceived overt victimization in response to emotional display predicted later internalizing symptoms only among boys and externalizing symptoms among both genders. Relational victimization predicted internalizing and externalizing symptoms among both genders. Neglect, overt victimization, and relational victimization can all be characterized as punitive responses to emotion display. Emotion neglect closely relates to dismissive responding, but over a longer term (Klimes-Dougan et al., 2014; Magai, 1996). Victimization in response to emotion is called "punishing," and is closely related to other aggressive behaviors (Crick & Grotpeter, 1995; Klimes-Dougan et al., 2014; Magai, 1996). These findings indicate that friends' consistent use of punitive responses predict poorer outcomes among children and adolescents.

One final process meriting mention in this section is co-rumination. As previously stated, co-rumination is positively associated with friendship quality even though it also predicts increases in internalizing symptomatology (Rose et al., 2007). Rose and colleagues (2007) documented that co-rumination is more common among middle school girls than among middle

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

school boys, and that girls are more at risk of developing internalizing psychopathology mediated by co-rumination. This observed gender effect for co-rumination may be explained by findings that early adolescent girls are more similar in their use of negative emotion terms than boys (Legerski et al., 2014), and that girls are more prone to social perspective taking than boys (Smith & Rose, 2011).

Co-rumination appears to be associated with other outcomes as well, both adaptive and maladaptive in kind. Tompkins and colleagues (2011) reported that co-rumination is associated with poor stress coping, suggesting that perhaps under particularly stressful circumstances; co-rumination could mediate the harmful effects of stress. Co-rumination also appears to mediate the spread of negative affectivity between close friends, a process known as emotion contagion (Rose et al., 2007). Others have hypothesized that co-rumination could facilitate the spread of externalizing behaviors, and might explain how deviancy increases among delinquent friends (Vitaro et al., 2009). It is possible that the negative outcomes associated with co-rumination only occur in particularly unhealthy contexts; for example, in excessively stressful, negative, or delinquent friendships, however, further study is needed.

### **The Present Study**

The present study addresses several gaps in the literature on socio-emotional processes within peer friendships and how they relate to youths' somatic health. Much of the extant literature focuses on the undesirable health effects of negative peer experiences, but fails to examine them within the context of peer friendships. Moreover, very few studies have assessed the role of positive social experiences within best friendships as they relate to the presence of somatic symptoms. This study will examine both negative and positive peer processes, and their associations with somatic health outcomes among same-age same-sex (11-15 years) friendship

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

dyads in middle school. This age group is especially pertinent to study given the increased manifestation of somatic complaints in middle to late adolescence (Rhee et al., 2005).

Somatic symptoms were assessed using a multi-reporter approach (youths' self-report and mother-report). Friendship processes were evaluated using both youths' self-report and third party coding of an observational task. The negative friendship processes examined in this study included overt victimization, relational victimization, and unsupportive emotion talk. The positive friendship processes assessed include companionship, conflict resolution, prosocial behavior, validation, intimate exchange, and supportive emotion talk. Associations of somatic complaints with self-reported co-rumination were also explored in the context of both high- and low-quality friendships. Gender differences were assessed with all of the aforementioned processes due to the differential somatic health outcomes and peer processes observed among early adolescent boys and girls (Kingery et al., 2011; Rhee, 2003; Rose et al., 2007).

**Hypotheses.** Based on the available literature, a set of hypotheses were formulated that were organized around social experiences that may place adolescents at risk or buffer them from somatic symptoms.

### **Risk experiences.**

**Victimization.** Consistent with the literature on somatic health and victimization (Gini et al., 2009; Nixon et al., 2011), we hypothesized that somatic complaints would be positively associated with both overt and relational victimization. Given that boys tend to experience more overt victimization, and girls tend to experience more relational victimization, we hypothesized that gender would moderate the association of somatic symptoms with both types of victimization. The relation between somatic symptoms and overt victimization was expected to

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

be stronger in boys than girls whereas the relation between somatic symptoms and relational victimization was expected to be stronger in girls.

***Unsupportive emotion responses.*** Youth's perceptions of unsupportive responses to emotion from their friends were hypothesized to predict higher somatic symptoms. Although no direct relationship between observed dismissive emotion talk and internalizing symptoms has been reported in the peer literature (Legerski et al., 2014), there is evidence to suggest that *perceived* punitive and neglectful responses from friends are harmful (Klimes-Dougan et al., 2014). Therefore, we examined perceived unsupportive and punitive responses from friends and expected them to predict higher somatic symptoms. Because it is the perception and not necessarily the overt behavior of unsupportiveness that appears to predict somatic symptoms, we hypothesized that friendship quality would affect this perception and mediate the relation. Specifically, perceived unsupportive responses to emotion are expected to predict somatic symptoms when friendship quality is *low*, and to have a limited effect when friendship quality is *high*.

***Co-rumination.*** Although co-rumination frequently predicts both internalizing symptoms and higher quality friendships, we hypothesized that the internalizing effects of ruminative behaviors would be greater than the potential protective effects of friendship, and that co-rumination would positively relate to somatic complaints. This effect was expected to be found among girls only, as girls are both more like to co-ruminate and tend to report more somatic symptoms than boys (Rhee, 2003; Rose et al., 2007).

### **Buffering experiences.**

***Supportive emotion responses and positive friendship quality.*** Among the positive processes examined, we hypothesized that perceived emotional supportiveness, companionship,

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

conflict resolution, prosocial behavior, validation, instrumental help, and intimate exchange would be negatively associated with somatic complaints, perhaps offering support for the Stress Buffering Hypothesis (Cohen & Willis, 1985; Windle, 1992). We also hypothesized that girls, more than boys, would demonstrate the association of positive friendship processes and somatic complaints, as early adolescent girls tend to rely more on friends for emotional support (Kingery et al., 2011).

### Method

#### Participants

A total of 200 youths (100 dyads) were recruited from Virginia ( $n = 94$ ) and Maryland ( $n = 6$ ) middle schools and youth engagement programs as part of a larger study examining youth's friendships and emotion regulation capacities. Middle school students entering grades six ( $n = 55$ , 27.5%), seven ( $n = 71$ , 35.5%), eight ( $n = 50$ , 25.0%), and nine ( $n = 24$ , 12.0%) participated, including 106 girls and 94 boys (53.0% female), ages 10-15 ( $M_{age} = 12.66$ ,  $SD = 1.02$ ). Youths identified themselves as Caucasian ( $n = 151$ , 75.5%), African-American ( $n = 36$ , 18.0%), Hispanic or Latino ( $n = 4$ , 2.0%), Asian ( $n = 3$ , 1.5%), or "Other" ( $n = 4$ , 2.0%). Participants were recruited with a same-sex close friend of their choice. Of the 200 youths in this sample, 179 (89.5%) reported participating with a "very best" or "best" friend. All youths participated with a "close" friend. Of 100 dyads, 85 (85.0%) contained children of the same ethnicity and 75 (75.0%) within the same grade friendships.

Youths' mothers ( $n = 167$ ), including 97 mothers of girls (58.1%) and 70 mothers of boys (41.9%) also participated. *Hollingshead Four-Factor Indices of Socioeconomic Status (SES-Adult*; Hollingshead, 1975) were computed from mother-reports of marital status, employment status, educational attainment, and occupation type. The sample consisted of primarily middle to



## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

upper-middle class families ( $M = 49.63$ ,  $SD = 9.80$ ). When examined by social strata, 49 (29.3%) were in the uppermost stratum, 76 (45.5%) were in the next highest stratum, 19 (11.4%) were in the middle stratum, four (2.4%) were in the second lowest stratum, and 19 (11.4%) were in the lowest social stratum.

### Materials

**Somatic symptoms.** Youth's somatic complaints were assessed using both adolescents' self-report and mother-report. Mothers responded to the 118-item Child Behavior Checklist (CBCL; Achenbach, 1991) using a 3-point scale (1 = *Not True (as far as you know)* to 2 = *Somewhat or Sometimes True* to 3 = *Very True or Often True*). The CBCL has six DSM5 oriented subscales including Somatic Complaints ( $\alpha = .71$ ), Affective Problems ( $\alpha = .81$ ), Anxiety Problems ( $\alpha = .79$ ), Oppositional Problems ( $\alpha = .86$ ), ADHD Problems ( $\alpha = .85$ ), and Conduct Problems ( $\alpha = .89$ ). The 7-item Somatic Complaints subscale has good internal consistency, with Cronbach alphas ranging from .71 to .77, as well as demonstrated convergent validity with other measures of internalizing and divergent validity with measures of externalizing behaviors (Nakamura, Ebesutani, Bernstein, & Chorpita, 2009). Mothers were asked to describe how often their child has displayed specific behaviors (e.g., "doesn't eat well") or symptoms (e.g., "aches or pains") within the past 6 months.

A more comprehensive measure of mother-reported somatic symptoms was developed for the purpose of this study, including four items from the CBCL Somatic Complaints subscale and seven items from the CBCL Affective Problems and Anxiety Problems subscales (see Table 1 for a full list of items). Internal consistency for the new 11-item scale was .62. Maximum Likelihood Factor Analysis (MLFA) using oblique (i.e., Direct Oblimin) rotation revealed three dimensions with simple structure (see Table 1). The first dimension contains symptoms

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

pertaining to Overweight and Inactivity, the second contains symptoms of Gastrointestinal Distress, and the third includes more general symptoms described as Fatigue and Aches. For the purposes of this research and with inter-correlations among the subscales, a total scale was used in analyses.

In addition to mothers reporting on their children's somatic symptoms, youth also reported on their own somatic complaints. A child-report measure of somatization was created for the purpose of this study, using four somatizing items from the Children's Depression Inventory (*CDI*; Kovacs, 1992) and two items from the Multidimensional Anxiety Scale for Children (*MASC*; March et al., 1997). More information is provided on these scales below (see Table 1). For the *CDI*, youth were asked to identify which of three statements (e.g., 0 = "*I never worry about aches and pains*," 1 = "*I worry about aches and pains sometimes*," 2 = "*I work about aches and pains all the time*") best described their experiences within the past two weeks. For the *MASC*, two items ("I get dizzy of faint feelings" and "I feel sick to my stomach") were rated on 4-point Likert type scales from 0 = *Never True About Me* to 3 = *Often True About Me*. Scores for both measures were standardized using Z-transformations and combined to yield a single self-report measure of youth's somatizing.

The new 6-item child-report measure achieved moderate internal consistency, with a Cronbach's alpha of .55. Maximum Likelihood Factor Analysis (MLFA) using oblique (i.e., Direct Oblimin) rotation revealed three dimensions with simple structure (see Table 1). The first dimension contains symptoms Nausea and Dizziness, the second contains Aches and Pains, and the third includes symptoms of Fatigue. For the purposes of this research and given inter-correlations among the subscales, a composite scale was used in analyses.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

**Depression and anxiety.** Other internalizing symptoms were assessed with the 27-item CDI (Kovacs, 1993) and 10-item MASC - *short version* (March et al., 1997) with somatizing items removed. Symptoms of depression were assessed using the CDI, a multi-factorial measure of children's depression symptoms, with five subscales including Negative Mood, Interpersonal Problems, Ineffectiveness, Anhedonia, and Negative Self-Esteem. It has demonstrated excellent internal consistency, with Cronbach alphas ranging from .80 to .94, and is validated for use with children ages 7-17 (Saylor, Finch, Spirito, & Bennett, 1984). For this study, four items regarding somatic symptoms were removed for analyses to prevent shared variance between somatizing and depression measures. The item regarding suicidal ideation was also removed prior to interviews with children to prevent unwarranted distress in participants and because it was not necessary to include for the purposes of the study. Internal consistency of the CDI with these items removed ( $n = 5$  items) was .85. As previously described, youth responded to the CDI by identifying which of three statements (e.g., 0 = "*I am sad once in a while*," 1 = "*I am sad many times*," 2 = "*I am sad all the time*") best described their experiences within the last two weeks. Using the original CDI (with suicidal ideation item removed;  $n = 26$  items), 12 (6.0%) participants were in the clinical range of depressive symptomology scores.

Symptoms of anxiety were assessed using the MASC – *short version*, a unifactorial measure of children's anxiety symptoms that has been validated for use with general and clinical populations of children ages 8-18. It has demonstrated excellent internal consistency, with Cronbach alphas ranging from .85 to .90 (March, Sullivan, & Parker, 1999). For this study, internal consistency (i.e., Cronbach's alpha) of the MASC-short form with somatizing items removed ( $n = 2$  items) was .73. As previously described, youth rated their recent symptoms of anxiety (e.g., "I feel restless and on edge") on a 4-point Likert type scale from 0 = *Never True*

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

*About Me* to 3 = *Often True About Me*. Using the original 10-item MASC, 34 (17%) participants were in the clinically significant range of anxiety symptomology scores.

**Victimization.** The 13-item *Social Experience Questionnaire* (SEQ; Crick & Grotpeter, 1996) was used to evaluate experiences of peer victimization and social kindness. The SEQ has three subscales including Overt Victimization ( $\alpha = .60$ ), Relational Victimization ( $\alpha = .78$ ), and Prosocial Behavior ( $\alpha = .82$ ; Storch, Crisp, Roberti, Bagner, & Masia-Warner, 2005). Youth responded to items such as, “How often do you get pushed or shoved?” (Overt Victimization), “How often are you left out on purpose when it’s time to do an activity?” (Relational Victimization), or “How often do you get help from another kid when you need it?” (Prosocial Behavior). Youth rated these experiences on a 5-point Likert type scale (0 = *Never* to 5 = *All the Time*). The overt victimization and relational victimization subscales demonstrate good convergent validity with other measures of psychosocial maladjustment (Storch et al., 2005). In this study, Cronbach’s alphas ranged from .74 to .83.

**Emotion talk.** Perceived emotional unsupportiveness (PEU) and perceived emotional supportiveness (PES) from friends were assessed with the 54-item (18 items per anger, sadness, and worry emotions) *You and Your Friends Questionnaire* (YYF; Klimes-Dougan et al., 2014). The YYF was adapted from the Emotions as a Child Questionnaire (EAC; O’Neal & Magai, 2005) – a measure of emotion talk in parent-child relationships. The YYF has six subscales including Overt Victimization ( $\alpha = .77$ ), Relational Victimization ( $\alpha = .86$ ), Neglect ( $\alpha = .91$ ), Reward ( $\alpha = .91$ ), Override ( $\alpha = .89$ ), and Magnify ( $\alpha = .83$ ). Youth rated how their friends respond to emotional displays on a 5-point Likert scale from 1 = *My Friend Would Definitely NOT Do This* to 5 = *My Friend Definitely WOULD Do This*.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

The Overt Aggression subscale assesses how often youth feel punished by their friends for emotional displays (e.g., “Say they don’t like it when you act this way”). The Relational Aggression subscale assesses how often youth feel excluded or manipulated by their friends for emotional displays (e.g., “Say they’ll stop liking you if you don’t change your attitude”). The Neglect subscale evaluates how often youth feel that their emotions are ignored (e.g., “Act like they don’t notice you feel sad”). The Reward subscale evaluates how much youth perceive their friends as validating of emotional display (e.g., “Help you deal with what made you feel angry”). The Override subscale assesses how often youths’ friends reportedly use distraction as an adaptive emotion socialization strategy (e.g., “Try to get you to do something else, to take your mind off it”). Lastly, the Magnify subscale assesses how often youths’ friends reportedly respond to emotional display with the same emotion (e.g., “Get worried too”).

For the purposes of this study and based on the published practices with this measure (Klimes-Dougan et al., 2014), the Neglect, Overt Victimization, and Relational Victimization subscales were combined to create an “Unsupportive Responses” total score and the Reward, Override, and Magnify subscales were combined to create a “Supportive Responses” total score. The Cronbach’s alphas in the current study for unsupportive responses were .76 for sadness, .81 for anger, and .82 for worry. The Cronbach’s alphas for supportive responses were .81 for sadness, .84 for anger, and .84 for worry.

**Co-rumination.** Co-rumination was assessed with both observational coding and a 27-item self-report measure, the *Co-Rumination Questionnaire (CRQ)* (Rose, 2002). The CRQ has excellent internal consistency with Cronbach’s alphas between .90 and .97 (Rose, 2002; Rose et al., 2007). There are three subscales of the CRQ including Rehashing ( $\alpha = .94$ ), Mulling ( $\alpha = .85$ ), and Encouraging Problem Talk ( $\alpha = .85$ ). In this study, the Cronbach’s alpha for complete

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

measure was .97. The CRQ has demonstrated good convergent validity with behavioral observation coding of co-rumination and self-reported rumination, as well as discriminant validity with measures of depression and thought control ability (Davidson et al., 2014).

Youth rated each item describing problem talk with their best friend on a 5-point Likert type scale (1 = *Not At All True* to 5 = *Really True*). Example items from each of the subscales include, "We'll talk about every part of the problem over and over" (Rehashing), "We talk a lot about parts of the problem that don't make sense to us" (Mulling), and "When my friend has a problem, I always try really hard to keep my friend talking about it" (Encouraging Problem Talk).

**Friendship quality.** Participants responded to questions about their friendships, including length of friendship, activities done together, and friendship quality. Positive friendship quality was assessed with an abridged 18-item *Friendship Quality Questionnaire* (FQQ; Parker & Asher, 1993), with subscales including Companionship and Recreation ( $\alpha = .75$ ), Conflict and Betrayal ( $\alpha = .83$ ), Conflict Resolution ( $\alpha = .73$ ), Validation and Caring ( $\alpha = .90$ ), Help and Guidance ( $\alpha = .90$ ), and Intimate Exchange ( $\alpha = .86$ ). Cronbach's alphas ranged from .65 to .88 in this study.

Youth rated how their friend typically acts in their relationship on a 5-point Likert type scale (1 = *Not At All True* to 5 = *Really True*). Example items from each of the subscales include, "[Friend] and I always play together at recess" (Companionship and Recreation), "[Friend] and I fight a lot" (Conflict and Betrayal), "[Friend] and I talk about how to get over being mad at each other" (Conflict Resolution), "[Friend] makes me feel good about my ideas" (Validation and Caring), "[Friend] and I give advice when figuring things out" (Help and Guidance), and "[Friend] and I always tell each other our problems" (Intimate Exchange).

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

**Problem talk discussion task.** Following the questionnaire portion of the protocol, each participant was prompted to think of a problem to be discussed with their same-sex best friend. Youths were then situated together in a private room in which they could discuss their respective problems with each other. A research assistant informed both participants that they would have 15 minutes to discuss their problems and if they finished early they could work on word puzzles. The research assistant then left the room. Discussions were timed and audiovisual recorded.

**Behavioral coding.** Each discussion task audio recording was transcribed by undergraduate research assistants and checked for accuracy by a separate trained assistant. In the event that audio was of poor quality ( $n = 4$ ), audio enhancements were made using Adobe Audition software. Visual recordings were also used during transcription to document any gestures, expressions, or other non-verbal language.

Graduate and undergraduate research assistants used audiovisual recordings and completed transcriptions to code for co-ruminative behaviors. Global co-rumination coding followed the scheme outlined by Rose and colleagues (2006), with which participants and whole dyads were rated on 5-point scales (from 1 = *Not at all* to 5 = *Very much*) for the frequency of four co-ruminative behaviors, including mutual encouragement of problem talk, problem rehashing, speculating about problems, and dwelling on negative affect.

Youth demonstrated mutual encouragement of problem talk when they attempted to keep their friends talking or tried to prevent their friend from getting off-topic. Youth were given higher problem rehashing scores when they frequently or excessively repeated their problems, when their problem talk was circular or saw no progression, and when they failed to expand upon the topic. Youth who speculated about problems spent the majority of the time talking about parts of the problem, the origins and outcomes associated with their problem, and the

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

meaning of their problem. Finally, youth who were coded for dwelling on negative affect demonstrated behaviors included use of negative emotion words to describe their problem, rehashing the negative emotional components of their problem, and failing to acknowledge the positive emotional aspects of their problem. See Appendix 1 for a detailed description of global co-rumination coding as described by Rose and colleagues (2006).

In addition to the above scores, participants were also rated on a 5-point rating scale (1 = *Not at all* to 5 = *Very much*) for their positive and negative tone. This subjective rating required careful attention to youth's facial expressions, vocal quality, and the context of discussion. Youth demonstrated an overall positive tone when they spent the majority of the time smiling, laughing, speaking more quickly and at higher pitch, and focusing on positive aspects of the discussion. Youth exhibited an overall negative tone when they spent much of the time frowning or scowling, speaking more slowly and at a lower pitch, and making negative or pessimistic comments. Youth could be given high scores on both positive and negative tone if they displayed a mix of the above behaviors, or were inconsistent in tone.

Following all componential ratings detailed above, each individual was given a general co-rumination score based on their relative levels of specific co-ruminative behaviors. Positive and negative tones were not included in the general co-rumination score. Research assistants coded the first recordings ( $n = 15$  dyads) together until a consistently high inter-rater reliability ( $ICC = .88$ ) was achieved. Raters met consistently each week to resolve disputed codes and to prevent inter-rater drift.

### **Procedure**

Prior to beginning the interviews, informed written consent from parents and oral assent from adolescents were obtained for both participants in each dyad. Participants were interviewed



## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

separately by two trained research assistants, one per child, in separate rooms. Interviews typically lasted between 30 to 50 minutes. During interviews, participants were read questionnaire measures aloud and asked to answer as accurately as possible. Following interviews, children were reunited with their friends and prompted to discuss an ongoing problem for 15 minutes. These discussions were audio and video recorded, while research assistants waited in a separate room. Upon completion of the study, each youth received \$10 for their time. Mothers' questionnaire packets were completed independently and took approximately 20 to 30 minutes to complete. Mothers ( $n = 167$ ) could complete the questionnaires during their child's interviews, or mail them in separately. Despite numerous emails and phone calls, 33 mothers did not complete their packet. Mothers did not receive financial compensation.

### **Results**

#### **Analytic Strategy**

Given that youth recruited for this study were required to participate with a best friend, much of the self-report data analyzed in this study is dyadic. Dyadic data poses a problem for standard analyses because it often violates the assumption of independence underlying most statistical tests (Cook & Kenny, 2005). Members of a mutually-designated dyad (e.g., a friendship) are more likely to be similar to one another in traits and behaviors than are two unfamiliar strangers; moreover, constructs pertaining to dyadic relationships (e.g., friendship quality) are subject to influence from both members of the dyad and therefore must be treated in a way that accounts for multiple contributors.

Non-independence in dyadic data may be identified by computing a measure of association between each dyad member's scores. For dyads with easily distinguishable members

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

(e.g., boy and girl or young and old), one could use the Pearson product-moment correlation. For dyads with indistinguishable members (e.g., same-sex or same-age), an intraclass correlation coefficient (ICC) should be computed (Cook & Kenny, 2005). If the correlation obtained is significant, then the data should be considered non-independent. However, non-independence is both an empirical and theoretical question. Even variables with non-significant ICCs may be interdependent if they concern constructs that are inherently dyadic (e.g., co-rumination). In general, it is better to assume non-independence when working with dyadic data to avoid an inflated likelihood of type I errors in correlational research (Cook & Kenny, 2005).

One way to approach dyadic data is to treat each dyad as an individual unit, and to separately model the variance between dyads (inter-dyadic variance) as well as between members of each dyad (intra-dyadic variance). This allows the researcher to distinguish between standard independent associations (actor effects) and dyadic interdependent associations (partner effects), each calculated while controlling for the effects of the other. This technique, called Actor-Partner Interdependence Modeling (APIM; Cook & Kenny, 2005), has become widely used in the social sciences, particularly when dealing with interpersonal relationships. These models yield a fairly conservative estimate of effects because treating dyads as individual units necessarily entails using an analytic sample of half the original number of cases and thus results in a reduction in power.

An actor effect refers to an association between two variables that occurs at the level of the individual (i.e., the effect of one person's characteristic on his or her own outcome), whereas a partner effect refers to an association between two variables that occurs at the level of the dyad (i.e., the effect of one person's characteristic on the *partner's* outcome). In addition to calculating these effects, APIM also includes an estimate of the association between outcome

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

variables that is *not* due to actor or partner effects (APIM; Cook & Kenny, 2005). This can be understood as the model's error, and may be due to the presence of some confounding variable. It is possible to enter covariates into the model to minimize this error.

APIM figures include estimates of both actor and partner effects, as well as intraclass correlations (ICCs) between both predictors and both outcome variables. For indistinguishable dyads, these effects will not differ by dyad member because whether each youth is designated "Youth 1" or "Youth 2" is determined arbitrarily (Cook & Kenny, 2005). A significant correlation between the predictors demonstrates the principle of non-independence and provides the justification for using APIM in analyses. A significant correlation between the outcome variables indicates that dyad members reported similar outcomes, whether they differed in levels of the predictor or not. See Figure 1 for an example APIM figure.

In this study, all Actor-Partner Models were created in SPSS using multilevel modeling with a single intercept, one actor variable per construct, and one partner variable per construct. Prior to analysis, all continuous variables were standardized, and missing values in child-reported ( $N = 9$  cases) and mother-reported ( $N = 4$  cases) somatic symptoms were replaced with their respective series means. The database was then restructured to reflect individual data nested under dyadic data. Descriptive statistics and correlations for the unstandardized data are provided in Table 2 and Table 3, respectively. All models included depression and anxiety symptomatology as covariates and either mother-reported or youths' self-reported somatic symptoms as outcome variables. Separate models were calculated for each predictor of interest, with gender included as either a covariate or as an interaction term if gender moderation was anticipated. Significant interactions were analyzed using online simple slope analytic tools by

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Preacher, Curran, and Bauer (2006). Significant actor and partner effects are reported in the next section for each of the study's hypotheses.

Since this study recruited only same-sex dyads of similar age (i.e., indistinguishable dyads), ICCs were computed when independence was in question. All constructs pertaining to friendship processes (friendship quality, co-rumination, and emotion talk) were assumed to be non-independent. ICCs for overt victimization, relational victimization, and prosocial behavior were nonsignificant. Since no theoretical reason exists for friends to experience similar levels of victimization or to display similar prosocial behavior, APIMs were not conducted for these variables. Multiple regression analyses were performed with depression and anxiety symptomatology in the first step and prosocial behavior, overt victimization, or relational victimization in the second step.

### **Risk Experiences**

**Victimization.** The model in which overt victimization predicted higher child-reported somatic symptoms was significant ( $b = .309$ ,  $t(187) = 3.70$ ,  $p = .001$ ,  $\Delta R^2 = .016$ ,  $F(1, 182) = 11.69$ ,  $p = .001$ ). Gender significantly moderated the relation between overt victimization and somatic symptoms ( $b = -.403$ ,  $t(187) = -3.42$ ,  $p = .001$ ), such that overt victimization significantly predicted somatizing only among girls (see Table 4).

Relational victimization predicted higher child-reported somatic symptoms ( $b = .277$ ,  $t(187) = 3.39$ ,  $p = .001$ ,  $\Delta R^2 = .017$ ,  $F(1, 182) = 4.83$ ,  $p = .001$ ). Likewise, gender moderated this relation ( $b = -.265$ ,  $t(182) = -2.20$ ,  $p = .03$ ), such that relational victimization predicted significantly higher somatizing only among girls (see Table 5).

**Unsupportive emotion responses.** Actor effects with perceived emotional unsupportiveness (PEU) were found for mother-reported somatic symptoms ( $b = .192$ ,  $t(139) =$

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

1.98,  $p = .05$ ), and for child-reported somatic symptoms ( $b = .123$ ,  $t(192) = 2.05$ ,  $p = .04$ ; see Figure 2), indicating that youth who perceive their close friends as being emotionally unsupportive (i.e., neglectful, overtly aggressive, or relationally aggressive) experience greater somatizing. When broken down by emotion type, significant actor effects were found for perceived sadness unsupportiveness (PSU), perceived anger unsupportiveness (PAU), and perceived worry unsupportiveness (PWU; see Figure 3a). PSU predicted higher mother-reported somatic symptoms ( $b = .185$ ,  $t(139) = 1.95$ ,  $p = .05$ ), PAU predicted higher child-reported somatic symptoms ( $b = .147$ ,  $t(185) = 2.47$ ,  $p = .01$ ), and PWU predicted higher child-reported somatic symptoms ( $b = .129$ ,  $t(191) = 2.10$ ,  $p = .04$ ).

Gender did not moderate the overall relationship between PEU and somatic symptoms; however, gender did moderate the partner effects for sadness and anger unsupportiveness predicting mother-reported somatic symptoms. A significant partner interaction occurred between gender and PSU ( $b = -.221$ ,  $t(139) = -2.04$ ,  $p = .04$ ), such that the partner-reported somatic symptoms decreased for observations of higher actor-reported PSU among boys (see Figure 3b). Similarly, a significant partner interaction was found between gender and PAU ( $b = -.258$ ,  $t(139) = -2.09$ ,  $p = .04$ ), such that partner-reported somatic symptoms decreased for higher observations of actor-reported PAU (see Figure 3c). In other words, the boys who were described by close friends as unsupportive of sadness or anger expression had significantly fewer somatic symptoms than boys who were not described as unsupportive of sadness or anger. This difference was not found for girls. Notably, friendship quality was not a significant moderator in any of these models.

### Co-rumination

No significant effects were found for observed co-rumination (interaction task). A significant partner interaction was found between perceived co-rumination (*CRQ*; Rose, 2002) and friendship quality for child-reported somatic symptoms (see Figure 4); however, the main effects were non-significant. In other words, greater co-rumination did not directly predict greater somatic symptoms for all dyads in the sample; rather its effects differed depending on the quality of each dyad's friendship.

The interaction model indicated a marginal attenuating effect of high actor-reported co-rumination on partner-reported somatic symptoms that decreased for higher observations of friendship quality ( $b = .502, t(192) = 1.91, p = .06$ ). There was also a significant amplifying effect of low actor-reported co-rumination on partner-reported somatic symptoms that decreased for higher observations of friendship quality ( $b = -.796, t(192) = 2.72, p = .01$ ). In other words, youth in *low* quality friendships whose friends reported *high* co-rumination had fewer somatic symptoms; whereas, youth in *low* quality friendships whose friends reported *low* co-rumination had more somatic symptoms. Similarly, youth in *high* quality friendships whose friends reported *high* co-rumination had greater somatic symptoms; whereas, youth in *high* quality friendships whose friends reported *low* co-rumination had fewer somatic symptoms. Gender did not moderate these effects.

### Buffering Friendship Experiences

**Supportive emotion responses.** A marginally significant actor effect was observed with PES for child-reported somatic symptoms, ( $b = -.113, t(192) = -1.89, p = .06$ ) and a significant actor effect was found for mother-reported somatic symptoms ( $b = -.203, t(135) = -2.13, p = .04$ ; see Figure 5), such that youth who perceived their friends as emotionally supportive reported

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

fewer somatic symptoms. Gender did not significantly moderate the relation between overall perceived emotional support and somatic symptoms, indicating that the relation of emotional support and somatizing holds for both genders. Further, no differences were found between emotion types of sadness, anger, or worry.

**Prosocial behavior.** Multiple regression analyses revealed that prosocial behavior was not a significant predictor of child-reported or mother-reported somatic symptoms. This could indicate the absence of a buffering effect of prosocial behavior or be a product of insufficient power to detect the relation.

**Positive friendship quality.** Companionship and intimate exchange were not significant predictors of somatic symptoms; however, instrumental help, validation, and conflict resolution did significantly predict lower child-reported and mother-reported somatic symptoms. A significant partner effect was observed with instrumental help for child-reported somatic symptoms ( $b = -.121$ ,  $t(187) = -1.95$ ,  $p = .05$ ), such that youth who were described by close friends as helpful and advice-giving reported fewer somatic symptoms than their counterparts (see Figure 6). Gender did not significantly interact with the instrumental help partner effect.

For validation, a significant actor effect predicted lower mother-reported somatic symptoms ( $b = -.272$ ,  $t(137) = -2.21$ ,  $p = .03$ ), such that youth who described having their feelings validated often by their best friends had fewer mother-reported somatic symptoms (see Figure 7). Gender did not significantly moderate this effect.

The model for conflict resolution indicated significant actor ( $b = -.247$ ,  $t(137) = -2.18$ ,  $p = .03$ ) and partner ( $b = -.282$ ,  $t(137) = -2.54$ ,  $p = .01$ ) main effects predicting lower mother-reported somatic symptoms (see Figure 8a). The presence of both actor and partner effects indicates that actor-reported conflict resolution predicts lower somatic symptoms in both oneself

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

and in one's friend. Gender moderated the partner effect, but not actor effect, (see Figure 8b), such that partner-reported somatic symptoms significantly decreased for higher observations of actor-reported conflict resolution only among girls ( $b = -.282$ ,  $t(137) = -2.82$ ,  $p = .006$ ). In other words, youth who described their friendships as high in conflict resolution had fewer somatic symptoms, and among girls the *friends* also had fewer somatic symptoms.

### Discussion

The goal of this study was to examine both the potential risk and buffering effects of peer friendships on somatic symptoms in early adolescent youth. This research advances the present understanding of the contribution of social functioning in pediatric somatization, which is a complex biopsychosocial health concern. Many studies have found that negative peer processes, such as peer victimization, contribute to somatizing; however, none have assessed the effects of victimization within the context of peer friendships. Additionally, while prior research indicates a protective benefit of high quality peer friendships against chronic medical illness (Chappel, 2013; Vitaro et al., 2009), no studies have examined these effects with regard to adolescent somatizing. The goal of this study was to build upon prior work with peer victimization to determine whether similar somatizing outcomes occur among friended youth, as well as to examine potential buffering processes within peer friendships. The results of the present study indicate that peer friendships offer a combination of both risk and protective effects that vary depending on friendship quality and the adolescents' gender. The specific findings of this study are interpreted in detail below.

### Risk Experiences

**Victimization.** Consistent with past findings, the experience of peer victimization at school predicted higher somatic symptoms among middle school youth (Gini et al., 2009; Nixon



## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

et al., 2011). Although it is possible that the relation is bidirectional, that is, youth with somatic symptoms are bullied because of their somatic symptoms, longitudinal research provides support for a unidirectional association of bullying leading to somatic symptoms (Nixon et al., 2011; Vernberg et al., 2011). Given the abundance of research on this topic, the replication of these extant findings with our sample provides some reassurance as to the validity of our study's findings. One novel contribution of our data to the victimization literature is the use of a best friend sample that indicates that the effects of peer victimization on somatization occur even for youth who have close friendships. Indeed, both friendless and friended youth may be vulnerable to the psychosomatic effects of peer victimization, indicating that lonely or "unpopular" children are likely not the only targets of bullying interventions.

Unexpectedly, the effect of overt victimization on somatization was moderated by gender in the opposite direction as hypothesized; that is, the effect remained significant only among girls. This result may reflect girls' greater tendency to somatize or may suggest differences in how peer victimization is experienced and internalized by young adolescent girls. Both possibilities remain feasible, given that girls do report more somatic symptoms than boys (Eminson et al., 1996; Wangby, 2000), and other studies have found higher levels of internalizing symptoms and disorders (i.e., depression, anxiety) in victimized girls than boys (Espelage, Low, & De La Rue, 2012). However, given that somatization and internalizing remain separable constructs (Garber et al., 1991; Vernberg, 2011), more study is needed to determine whether the gender effect of overt victimization on internalizing symptoms extends to somatization as well.

The effect of relational victimization on somatic symptoms was also moderated by gender, this time in the expected direction, such that the effect remained significant only for

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

girls. This could reflect both girls' greater tendency to report somatic symptoms, as well as their relatively more frequent experience of relational victimization. The absence of significant effects for boys could indicate a difference in how boys internalize their own victimization, or perhaps these analyses could be capturing a protective effect of best friendship that buffer the effect of victimization for boys only. Further study will be needed to determine whether the buffering effect of friendship on victimization differs by gender.

**Emotionally unsupportive friend responses.** As hypothesized, youth-reported perceptions of their friends' emotional unsupportiveness predicted higher somatic symptoms. However, friendship quality did not significantly interact with emotional unsupportiveness. Earlier work suggests that dismissive responses alone may not be enough to predict internalizing behaviors within best friendships (Legerski et al., 2014), whereas, punitive responses strongly predict internalizing and externalizing outcomes in many youth (Klimes-Dougan et al., 2014). Given that this study's measure of perceived emotional unsupportiveness included not only dismissive responses (neglect) but also punitive responses (overt and relational aggression), it is possible that these findings reflect the active punishing aspect of unsupportive behavior more so than the passive or disengaged aspects of unsupportiveness. Further research is needed to distinguish between dismissive and punishing responses to emotion display within friendships, particularly with regards to somatization.

A clear effect of perceived emotional unsupportiveness persisted for all three negative emotion types (i.e., sadness, anger, and worry), indicating that youth may in fact be vulnerable to their friends' unkind responses to emotional display. It is also possible that somatizing youth have a negative outlook that colors their perceptions of receiving emotional support from their friends to all types of negative emotions. That is, their friends may offer support but the

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

somatizing friend does not perceive it as being supportive. It also may be that youth did not differentiate between the three emotions when asked about their friend's responses to their own sadness, anger, and worry experiences. Youth may view their friend's emotional reactions to be similar across emotions and may not recognize subtle differences in responsivity. Finally, the YYF questionnaire is limited in that it does not capture more ecologically valid instances of experiencing blends of different emotions (e.g., feeling sad and mad in a response to a situation) and this may be reflected in the findings.

Another factor to consider when interpreting this finding is the overlap between the findings of emotionally unsupportive behaviors and peer victimization, given the presence of overt and relational victimization subscales in the YYF measure. This overlap is likely evidenced by the significant correlation between perceived unsupportive responses and self-reported experiences of overt victimization. It is not surprising, then, that victimization and perceived emotional unsupportiveness share similar outcomes. However, the two constructs do differ in meaningful ways. Peer victimization is generally considered to be unprovoked aggression towards a weaker youth (Espelage et al., 2012), whereas emotion punitive behaviors are reactions to context-dependent emotional displays by another person. Moreover, in the present study, youth reported on their best friend's emotion unsupportiveness, but the origins of general peer victimization could belong to any unnamed peer and not necessarily the best friend. Thus, although emotion unsupportiveness and peer victimization may be related and have comparable outcomes, they are still independent entities in terms of measurable effects and the individuals perpetuating the behaviors.

Interestingly, gender did not moderate the effect of unsupportive emotion responses on one's own somatic symptoms, though it did interact with the partner effects for both sadness and

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

anger unsupportiveness. That is, among youth who were unsupportive of their friend's sadness or anger displays, only the boys had significantly *fewer* somatic symptoms, whereas girls' somatic symptoms were no different than average. This is an interesting finding, as perceived emotional unsupportiveness was not predicted to have any effects on youths' friends. It is more likely that non-somatizing youth were significantly more prone to using punitive or dismissing responses to their friends' negative emotions, perhaps because they had trouble understanding or empathizing with their friend's difficulties or because they themselves had difficulty tolerating the distress of the friend. It would be interesting to explore whether this effect would occur with positive emotions, such as happiness or pride. Further research will be needed to explore this association.

**Co-rumination.** Co-rumination did not directly predict higher somatic symptoms, as hypothesized; however, it did interact with friendship quality to differentially predict somatic symptoms. That is, when friendship quality was low, co-rumination predicted fewer somatic symptoms, but when friendship quality was high, co-rumination predicted more somatic symptoms. These findings suggest that co-rumination may introduce additional risk into high quality friendships, perhaps because high quality friends are more likely to co-ruminate excessively. Conversely, when low-quality friends co-ruminate there may be no harmful effect, and even a potential benefit. Perhaps moderate co-rumination (i.e., not to an excess) allows youth to vent their frustrations, or having frustrations to vent provides an opportunity for youth to develop more supportive friendships.

It is interesting that this effect only emerged with youths' self-reported (i.e., perceived) co-rumination and not with the co-ruminative behaviors coded during the observation task. It is possible that coding a 15-minute sample of youths' conversations while being video-taped failed to capture an overall tendency to co-ruminate even though this is the standard task used to

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

capture co-rumination (Rose, 2002). It is also possible that youths' self-reported co-rumination is more indicative of their perception of friendship quality than it is of co-rumination itself, as is evidenced by strong correlation between perceived friendship quality and co-rumination.

### **Buffering Experiences**

**Emotionally supportive friend responses.** As hypothesized, youth who described their friends as supportive of emotional displays had fewer somatic symptoms. This effect did not differ by emotion-type or gender, suggesting that an overall perception of receiving emotional support is an important aspect of peer support. It is possible that non-somatizing youth were more likely to report feeling emotionally supported than their non-somatizing counterparts; however, it is also likely that emotional support functioned like other forms of peer support to buffer the impact of somatization. Given that a vast array of studies exists to support the Stress Buffering Hypothesis of peer support (Chappel, 2013; Cohen & Willis, 1985; Gini et al., 2009), the latter explanation seems a reasonable conclusion. However, further study will be needed to better understand the directionality of effects.

**Positive friendship quality.** Some aspects of high quality friendships, including instrumental help, validation, and conflict resolution did predict lower somatic symptoms, as hypothesized. However, no significant effects were found for companionship or intimate exchange, suggesting that some aspects of peer best friendship may be more protective than others in terms of buffering somatic symptoms. An in-depth discussion of these findings by friendship quality component is continued below.

**Instrumental help.** Interestingly, no actor effects of instrumental help were observed; however, the partner effect was significant, indicating that offering concrete assistance when a friend is in need may have a buffering effect on the *friend's* somatization. Perhaps offering help

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

to others serves as a useful distraction from one's symptoms. Or perhaps youth who frequently help their friends receive other kinds of support in return, which could also mitigate symptoms. It is also possible that somatizing youth simply perceive themselves as less helpful or less able to offer instrumental assistance to their friends.

Gender did not moderate this association, which is consistent with the literature on instrumental help. That is, while girls may rely on friendships more for validation and emotional support (Kingery et al., 2011), there is no evidence of gender differences in advice-giving or helpfulness. It is, however, possible that adolescent boys and girls differ in how they help their friends, rather than differences in frequencies. Further research could explore these differences in more detail.

It is also worth noting that while a buffering effect of instrumental help would be consistent with previous studies of the protective effects of peer support (Gini et al., 2009; Ladd, Kockenderger, & Coleman, 2008), it is also possible that somatizing youth require more help than their healthy peers and therefore are more likely to feel that they are not getting enough assistance from their friends. Likewise, non-somatizing youth may not need as much help from their best friend, and therefore may be more likely to be satisfied with their current levels of assistance.

***Validation.*** As predicted, youth who reported often receiving validation from their best friend had fewer somatic symptoms. Given previous studies that suggested a buffering effect of validation on internalizing behaviors (Chappel, 2013; Cohen & Willis, 1985), it is likely that validation offers some protective benefit against somatizing. As with other aspects of peer friendship, though, it is worth considering bi-directional effects as a possible interpretation of these findings. That is, somatizing youth may perceive less validation than non-somatizing youth

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

simply because they require more support or because they may have a more negative outlook in general. Perhaps it is also more difficult for peers to offer validation to their somatizing friends because they do not know what will make their friends feel better.

However, validation has been shown to reduce youths' reports of low self-esteem (Kingery et al., 2011), and low self-esteem does indeed predict increased somatizing (Miers et al., 2007). The possibility that high validation buffers the effects of low self-esteem on somatic symptoms would lend greater support for the Stress Buffering Hypothesis. That is, if validation from a best friend bolsters youths' self-esteem that may reduce the stress associated with poor confidence in one's own abilities.

***Conflict resolution.*** As hypothesized, conflict resolution predicted lower frequency of somatic symptoms in youths (actor effect); however, unexpectedly, it also predicted lower somatic symptoms in the youths' best friends (partner effect). The actor effect of conflict resolution could indicate that ability to resolve or prevent conflict may reduce somatic symptoms. It is also possible that somatizing youth perceive less conflict resolution within their friendships, perhaps perceiving their friendships as more conflict-ridden. The partner effect, intriguingly suggests that the ability to resolve conflict may be similarly beneficial to the friend. Being able to actively solve a conflict likely reduces feelings of stress that otherwise could become "bottled up" if a person suppresses the negative affect associated with interpersonal conflict (Gross & Jazaieri, 2014). The relation could also be explained by somatizing youth doubting their own abilities to resolve arguments. That is, perhaps a related effect of somatization is a reduced confidence in one's interpersonal problem solving ability.

Gender did not moderate the actor effect, suggesting that conflict resolution may be a beneficial skill regardless of gender. The partner effect, however, was moderated by gender such

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

that the effect was significantly stronger among girls than boys. This finding may reflect girls' tendencies to rely more on relationships for peer support (Kingery et al., 2011). It may also be that girls are more sensitive to perceived interpersonal conflict and are more strongly motivated to resolve it (Rose & Asher, 1999).

***Companionship and intimate exchange.*** No significant effects for the friendship quality components of companionship or intimate exchange were found in the present study. Notably, the aspects of best friendship that had significant effects on somatizing could all be considered to be strategies that require "active" initiation. That is, companionship is a somewhat passive aspect of friendship (i.e., simply being present) and intimate exchange is a strategy that relies solely on sharing private information. In contrast, instrumental help, validation, and conflict resolution are all direct and active approaches to assisting a friend in need of support. Moreover, all three approaches offer a form of stress reduction consistent with the Stress Buffering Hypothesis (Cohen & Willis, 1985; Windle, 1992).

For example, youths might offer instrumental help in the form of practical advice or problem solving when their friends are stressed. Validation aids youths in their own decision-making, and had been theorized to protect against the effects of loneliness (Parker & Asher, 1993). Lastly conflict resolution offers a very useful skill for dealing with the immediate stressors of interpersonal conflict, particularly the more distressing conflict that occurs with one's best friend. Since interpersonal conflict is known to be particularly predictive of somatization (Murberg & Bru, 2004; Parker & Asher, 1993), conflict resolution might offer the benefits of a reprieve from conflict, if not preventative effects.



### **Limitations and Future Directions**

Although this study had many strengths, including the use of multiple reports of somatic symptoms, conservative analyses of dyadic data, the ability to examine both intra- and inter-dyadic effects via APIM (Kenny et al., 2006), and an adequate sample size, there were also several weaknesses. As a cross-sectional study with data collected at a single time point, we were unable to establish the direction of effects that are necessary for inferring causation. The findings from this study should be replicated with a more diverse sample, especially given the prevalence of somatic symptoms in lower SES populations (Bailey, 2005; Mai, 2004). Replication of our findings using a clinical sample would also be useful, as the types of risk and buffering effects on somatization may differ significantly when youth have a clinical level of somatic complaints. Future research should also examine whether the effects are bi-directional as many of this study's variables exhibit characteristics of mutual influence. Finally, more research is needed to elucidate the psychobiological mechanisms involved in somatization in the context of the social environment rather than in the lab. The role of stress reduction (i.e., reduction of both physiological and psychological stress) as a mediator between best friend support and somatization would be a particularly useful topic for future study.

In sum, the findings of this study suggest that friendships in early adolescence confer both negative and positive effects that can potentially exacerbate somatic symptoms or reduce these symptoms. These results lend support for the Stress Buffering Hypothesis of peer support; however, these findings also indicate that negative processes including peer victimization and unsupportive emotion talk by a close friend may place adolescents at risk for somatizing. Therefore, it is important to structure interventions for middle school students so that they target a broad enough range of youth to capture all who may be at risk. Youth experiencing frequent

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

interpersonal stress ought to be included, regardless of their friendship status or perceived popularity. As for the development of effective interventions for these youth, some might involve encouragement of healthy low-stress friendships with conflict resolution skills, validation of one another's talents and capabilities, helpful behavior, and emotional support, while minimizing conflict and emotionally unsupportive behavior. Future studies could examine the ability of such interventions to reduce stress and attenuate somatic symptoms.

## References

- Achenbach, T. (1991). *Manual for the Child Behavior Checklist/4-18 and 1991 Profile*.  
Burlington, VT: University of Vermont Department of Psychiatry.
- American Psychiatric Association, DSM-5 Task Force. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*.
- Bagwell, C. L., Newcomb, A. F., & Bukowski, W. M. (1998). Preadolescent friendship and peer rejection as predictors of adult adjustment. *Child Development*, 69(1), 140-153.  
doi:10.1111/j.1467-8624.1998.tb06139.x
- Bailey, N., Delaney-Black, V., Hannigan, H., Ager, J., Sokol, J., & Covington, Y. (2005).  
Somatic complaints in children and community violence exposure. *Journal of Developmental & Behavioral Pediatrics*, 26(5), 341-348.
- Bakken, L., & Romig, C. (1992). Interpersonal needs in middle adolescents: companionship, leadership, and intimacy. *Journal of Adolescence*, 15(3), 301-316.
- Barbee, J. G., Todorov, A. A., Kuczmierczyk, A. R., Mancuso, D. M., Schwab, J. J., Maddock, R. J... Davidson, J. R. T. (1997). Explained and unexplained medical symptoms in generalized anxiety disorder and panic disorder: Relationship to the somatoform disorders. *Annals of Clinical Psychiatry*, 9(3), 149-155.
- Bauer, A. M., Quas, J. A., & Boyce, W. T. (2002). Associations between physiological reactivity and children's behavior: advantages of a multisystem approach. *Journal of Developmental and Behavioral Pediatrics*, 23(2), 102-113.
- Beck, J. E. (2008). A developmental perspective on functional somatic symptoms. *Journal of Pediatric Psychology*, 33(5), 547-562. doi:10.1093/jpepsy/jsml113

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Bollmer, H. J. M., Milich, R., Harris, M. J., & Maras, M. A. (2005). A friend in need: The role of friendship quality as a protective factor in peer victimization and bullying. *Journal of Interpersonal Violence, 20*(6), 701-712. doi:10.1177/0886260504272897
- Brosschot, J. F., Gerin, W., & Thayer, J. F. (2006). The perseverative cognition hypothesis: A review of worry, prolonged stress-related physiological activation, and health. *Journal of Psychosomatic Research, 60*(2), 113-124. doi:10.1016/j.jpsychores.2005.06.074
- Brosschot, J. F., & van der Doef, M. (2006). Daily worrying and somatic health complaints: Testing the effectiveness of a simple worry reduction intervention. *Psychology and Health, 21*(1), 19-31, doi:10.1080/14768320500105346
- Bukowski, W. M., Hoza, B., & Boivin, M. (1994). Measuring friendship quality during pre- and early adolescence: The development and psychometric properties of the Friendship Qualities scale. *Journal of Social and Personal Relationships, 11*(3), 471-484. doi:10.1177/0256407594113011
- Byrd-Craven, J., Granger, D. A., & Auer, B. J. (2010). Stress reactivity to co-rumination in young women's friendships: Cortisol, alpha-amylase, and negative affect focus. *Journal of Social and Personal Relationships, 27*(1), 101-120. doi:10.1177/0265407510382319
- Campo, J. V., & Fritsch, S. L. (1994). Somatization in children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 33*(9), 1223-1235. doi:10.1097/00004583-199411000-00003
- Chappel, A. M. (2013). *A longitudinal investigation of stress, complete mental health, and social support among high school students* (Doctoral Dissertation). Retrieved from PsychNET.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Cohen, S., Janicki-Deverts, D., Doyle, W. J., Miller, G. E., Frank, E., Rabin, B. S., & Turner, R.

B. (2012). *Proceedings of the National Academy of Sciences*, 109(16), 5995–

5999, doi:10.1073/pnas.1118355109

Cohen, S., & Willis, T. A. (1985). Stress, social support, and the buffering hypothesis.

*Psychological bulletin*, 98, 310-357.

Cook, W. L., & Kenny, D. A. (2005). The actor–partner interdependence model: A model of

bidirectional effects in developmental studies. *International Journal of Behavioral*

*Development*, 29(2), 101-109.

Crick, N.R., & Grotpeter, J.K. (1996). Children's treatment by peers: Victims of relational and

overt aggression. *Development and Psychopathology*, 8, 579-588.

Crick, N.R., & Grotpeter, J.K. (1995). Relational aggression, gender, and social-psychological

adjustment. *Child Development*, 66, 710-722.

Csikszentmihalyi, M., & Larson, R. (1984). *Being Adolescent*. New York: Basic.

Davidson, C. L., Grant, D. M., Byrd-Craven, J., Mills, A. C., Judah, M. R., & Lechner, W. V.

(2014). Psychometric properties of the co-rumination questionnaire. *Personality and*

*Individual Differences*, 70, 171-175. doi:10.1016/j.paid.2014.07.002

Dhossche, D., Ferdinand R., van der Ende, F., & Verhulst, F. (2001). Outcome of self-reported

functional-somatic symptoms in a community sample of adolescents. *Annals of Clinical*

*Psychology*, 13(4), 191-199.

Dubow, E. F., Tisak, J., Causey, D., Hryshko, A., & Reid, G. (2008). A two-year longitudinal

study of stressful life events, social support, and social problem-solving skills: Contributions

to children's behavioral and academic adjustment. *Child Development*, 62(3), 583-399.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Eminson, M., Benjamin, S., Shortall, A., Woods, T., & Faragher, B. (1996). Physical symptoms and illness attitudes in adolescents: An epidemiological study. *Journal of Child Psychology and Psychiatry*, 37(5), 519-528.
- Erdley, C. A., Nangle, D. W., Newman, J. E., & Carpenter, E. M. (2002). Children's friendship experiences and psychological adjustment: Theory and research. *New Directions for Child and Adolescent Development*, 2001(91), 5-24. doi:10.1002/cd.3
- Espelage, D. L., Low, S., & De La Rue, L. (2012). Relations between peer victimization subtypes, family violence, and psychological outcomes during early adolescence. *Psychology of Violence*, 2(4), 313-324.
- Flett, G. L., Molnar, D. S., Nepon, T., & Hewitt, P. L. (2012). A mediational model of perfectionistic automatic thoughts and psychosomatic symptoms: The roles of negative affect and daily hassles. *Personality and Individual Differences*, 52(5), 565-570. doi: 10.1016/j.paid.2011.09.010
- Garber, J., Walker, L., & Zeman, J. (1996). Somatization symptoms in a community sample of children and adolescents: Further validation of the children's somatization inventory. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 3(4), 588-595. doi:10.1037/1040-3590.3.4.588
- Gini, G., Carli, G., & Pozzoli, T. (2009). Social support, peer victimisation, and somatic complaints: A mediational analysis. *Journal of Paediatrics and Child Health*, 45(6), 358-363. doi:10.1111/j.1440-1754.2009.01501.x
- Gross, J. J., & Jazaieri, H. (2014). Emotion, emotion regulation, and psychopathology. *Clinical Psychological Science*, 2(4). doi:10.1177/2167702614536164

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Gunnar, M. R. (1992). Reactivity of the hypothalamic-pituitary-adrenocortical system to stressors in normal infants and children. *Pediatrics*, 90, 491-497.
- Hart, S., Hodgkinson, S., Belcher, H. E., Hyman, C., & Cooley-Strickland, M. (2013). Somatic symptoms, peer and school stress, and family and community violence exposure among urban elementary school children. *Journal of Behavioral Medicine*, 36(5), 454-465.  
doi:10.1007/s10865-012-9440-2
- Hodges, E. V. E., Boivin, M., Vitaro, F., & Bukowski, W. M. (1999). The power of friendship: Protection against an escalating cycle of peer victimization. *Developmental Psychology*, 35(1), 94-101.
- Hughes, A. A., Lourea-Waddell B., & Kendall, P.C. (2008). Somatic complaints in children with anxiety disorders and their unique prediction of poorer academic performance. *Child Psychiatry and Human Development*, 39(2), 211-220.
- Jellesma, F. C., Rieffe, C. F., & Terwogt, M. M. (2008). My peers, my friend, and I: Peer interactions and somatic complaints in boys and girls. *Social Science Medicine*, 66(11), 2195-2205. doi:10.1016/j.socscimed.2008.01.029
- Jenkins, J. M., & Smith, M. A. (1990). Factors protecting children living in disharmonious homes: Maternal reports. *Journal of the American Academy of Child & Adolescent Psychiatry*, 29(1), 60-69. doi:10.1097/00004583-199001000-00011
- Johnson, H. D. (2004). Gender, grade, and relationship differences in emotion closeness within adolescent friendships. *Adolescence*, 39, 243-255.
- Kellner, R. (1990). Somatization theories and research. *Journal of Nervous and Mental Diseases*, 178(3), 150-160.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Keefe, K., & Berndt, T. J. (1996). Relations of friendship quality to self-esteem in early adolescence. *The Journal of Early Adolescence*, 16(1), 110-129.  
doi:10.1177/0272431696016001007
- Kingery, J. N., Ginsburg, G. S., & Alfano, C. A. (2007). Somatic symptoms and anxiety among African American adolescents. *Journal of Black Psychology*, 33(4), 363-378.  
doi:10.1177/0095798407307041
- Kingery, J. N., Erdley, C. A., & Marshall, K. C. (2011). Peer acceptance and friendship as predictors of early adolescents' adjustment across the middle school transition. *Merill-Palmer Quarterly*, 57(3), 215-243. doi:10.1353/mpq.2011.0012
- Klimes-Dougan, B., Pearson, T. E., Jappe, L., Mathieson, L., Simard, M. R., Hastings, P., & Zahn-Waxler, C. (2014). Adolescent emotion socialization: A longitudinal study of friends' responses to negative emotions. *Social Development*, 23(2), 395-412.  
doi:10.1111/sode.12045
- Kovacs, M. (1992). *Children's Depression Inventory (CDI) manual*. North Tonawanda, NY: Multi-Health Systems, Inc.
- Ladd, G. W., Kochenderfer, B. J., & Coleman, C. C. (1996). Friendship quality as a predictor of young children's early school adjustment. *Child Development*, 67(3), 1103-1118.  
doi:10.1111/j.1467-8624.1996.tb01785.x
- La Greca, A. M., & Harrison, H. M. (2005). Adolescent peer relations, friendships, and romantic relationships: Do they predict social anxiety and depression? *Journal of Clinical Child and Adolescent Psychology*, 34(1), 49-61.



## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Lavigne, J. V., Saps, M., & Bryant, F. B. (2014). Models of anxiety, depression, somatization, and coping as predictors of abdominal pain in a community sample of school-age children. *Journal of Pediatric Psychology, 39*(1), 9-22.
- Legerski, J., Biggs, B. K., Greenhoot, A. F., & Sampilo, M. L. (2014). Emotion talk and friend responses among early adolescent same-sex friend dyads. *Social Development*, Online.
- Magai, C. (1996). Emotions as a child: Adult version. Unpublished scale, Long Island University, Brooklyn, New York.
- Mai, F. (2004). Somatization disorder: A practical review. *Canadian Journal of Psychiatry, 49*(10), 652-662.
- March, J. S., Parker, J. D., Sullivan, K., Stallings, P., & Conners, C. K. (1997). The multidimensional anxiety scale for children (MASC): Factor structure, reliability, and validity. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*(4), 554-65.
- March, J. S., Sullivan, K., & Parker, J. D. (1999). Test-retest reliability of the multidimensional anxiety scale for children. *Journal of Anxiety Disorders, 13* (4), 349-358.
- Miers, A. C., Rieffe, C., Terwogt, M. M., Cowan, R., & Linden, W. (2007). The relation between anger coping strategies, anger mood, and somatic complaints in children and adolescents. *Journal of Abnormal Child Psychology, 35*(4), 653-664.
- Miller, G. E., Cohen, S., & Ritchey, A. K. (2002). Chronic psychological stress and the regulation of pro-inflammatory cytokines: A glucocorticoid-resistance model. *Health Psychology, 21*(6), 531-541. doi:10.1037/0278-6133.21.6.531

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Murberg, T. A., & Bru, E. (2004). School-related stress and psychosomatic symptoms among Norwegian adolescents. *School Psychology International*, 25(3), 317-322. doi: 10.1177/0143034304046904
- Nakamura, B. J., Ebesutani, C., Bernstein, A., & Chorpita, B. F. (2009). A psychometric analysis of the child-behavior checklist DSM-oriented scales. *Journal of Psychopathological Behavior Assessment*, 31, 178-189. DOI: 10.1007/s10862-008-9119-8
- Nishina, A., Juvonen, J., & Witkow, M. R. (2005). Sticks and stones may break my bones, but names will make me feel sick: The psychosocial, somatic, and scholastic consequences of peer harassment. *Journal of Clinical Child & Adolescent Psychology*, 34(1), 37-48. doi:10.1207/s15374424jccp3401\_4
- Nixon, C. L., Linkie, C. A., Coleman, P. K., & Fitch, C. (2011). Peer relational victimization and somatic complaints during adolescence [Abstract]. *The Journal of Adolescent Health*, 49(3) 294-299.
- Offord, D. R., Boyle, M. H., Szatmari, P., Rae-Grant, N. I., Links, P. S., Cadman, D. T...Byrne, C. (1987). Ontario child health study: II. Six-month prevalence of disorder and rates of service utilization. *Archives of General Psychiatry*, 44 832-836.
- Ouellet-Morin, I., Danese, A., Bowes, L., Shakoor, S., Ambler, A., Pariante, C. M... Arseneault, L. (2011). A discordant monozygotic twin design shows blunted cortisol reactivity among bullied children. *Journal of the American Academy of Child & Adolescent Psychiatry*, 50(6), 574-582. doi:10.1016/j.jaac.2011.02.015

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Parker, J. G., & Asher, S. R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. *Developmental Psychology*, 29(4), 611-621. doi:10.1037/0012-1649.29.4.611
- Penza-Clyve, S., & Zeman, J. (2002). Initial validation of the emotion expression scale for children. *Journal of Clinical Child and Adolescent Psychology*, 31, 540-547.
- Pihlakoski, L., Sourander, A. F., Aromaa, M. F., Rautava, P. F., Helenius, H. F., & Sillanpaa, M. (2006). The continuity of psychopathology from early childhood to preadolescence: A prospective cohort study of 3-12-year-old children. *European Child & Adolescent Psychiatry*, 15(7), 409-417.
- Poikolainen, K., Aalto-Setälä, T., Marttunen, M., Tuulio-Henricksson, A., & Lonnqvist, J. (2000). Predictors of somatic symptoms: A five year follow up of adolescents. *Archives of Disease in Childhood*, 83(5), 388-392. doi:10.1136/adc.83.5.388
- Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, 31, 437-448.
- Reynolds, L., O'Koon, J., Papademetriou, E., Szczygiel, S., & Grant, K. (2001). Stress and somatic complaints in low-income urban adolescents. *Journal of Youth and Adolescence*, 30(4), 499-514. doi:10.1023/A:1010401417828
- Rhee, H. (2003). Physical symptoms in children and adolescents. *Annual Review of Nursing Research*, 21, 95-121.
- Rhee, H. (2005). Racial/ethnic differences in adolescents' physical symptoms. *Journal of Pediatric Nursing*, 20(3), 153-162.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Rhee, H., Holditch-Davis, D., & Miles, M. S. (2005). Patterns of physical symptoms and relationships with psychosocial factors in adolescents. *Psychosomatic Medicine*, 67(6), 1006-1012.
- Rhee, H., Miles, M.S., Halpern, C. T., & Holditch-Davis, D. (2005). Prevalence of recurrent physical symptoms in U.S. adolescents. *Pediatric Nursing*, 31(4), 314-250.
- Richards, M. H., Crowe, P. A., Larson R., & Swarr, A. (1998). Developmental patterns and gender differences in the experience of peer companionship during adolescence. *Child Development*, 69(1), 154-163.
- Rief, W., & Auer, C. (2000). Cortisol and somatization. *Biological Psychology*, 53(1), 13-23.
- Rief, W., Hennings, A. F., Riemer, S. F., & Euteneuer, F. (2010). Psychobiological differences between depression and somatization. *Journal of Psychosomatic Research*, 68(5), 495-502. doi:10.1016/j.jpsychores.2010.02.001
- Rose, A. J., & Asher, S. R. (1999). Children's goals and strategies in response to conflicts within a friendship. *Developmental Psychology*, 35(1), 69-79. doi:10.1037/0012-1649.35.1.69
- Rose, A. J., Carlson, W., & Waller, E. M. (2007). Prospective associations of co-rumination with friendship and emotional adjustment: Considering the socioemotional trade-offs of co-rumination. *Developmental Psychology*, 43(4), 1019-1031.
- Rose, A. J., Swenson, L. P., Waller, E. M., Glick, G. C., Smith, R. L., Schwartz-Mette, R. A., & Carlson, W. (2006). Overview of observational procedures and coding manual for NIMH project R01 MH 073590 in *Co-rumination and Adjustment: A Multimethod Assessment*. University of Missouri, Columbia.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Ruchkin, V., & Schwab-Stone, M. (2014). A longitudinal study of somatic complaints in urban adolescents: The role of internalizing psychopathology and somatic anxiety. *Journal of Youth and Adolescence*, 43(5), 834-845. doi:10.1007/s10964-013-9966-9
- Rudolph, K. D., Troop-Gordon, W., & Granger, D. A. (2011). Individual differences in biological stress responses moderate the contribution of early peer victimization to subsequent depressive symptoms. *Psychopharmacology*, 214(1), 209-219. doi:10.1007/s00213-010-1879-7
- Saylor, C. F., Finch, A. J., Spirito, A., & Bennett, B. (1984). The children's depressive inventory: A systematic evaluation of psychometric properties. *Journal of Consulting and Clinical Psychology*, 52(6), 955-967. doi:10.1037/0022-006X.52.6.955
- Selye, H. (1950). Stress and the general adaptation syndrome. *British Medical Journal*, 1(4667), 1383-1392.
- Simola, P., Liukkonen, K., Pitkäranta, A., Pirinen, T., & Aronen, E. T. (2014). Psychosocial and somatic outcomes of sleep problems in children: A 4-year follow-up study. *Child: Care, Health and Development*, 40(1), 60-67. doi:10.1111/j.1365-2214.2012.01412.x
- Smith, R. L., & Rose, A. J. (2011). The "cost of caring" in youths' friendships: Considering associations among social perspective taking, co-rumination, and empathetic distress. *Developmental Psychology*, 47(6), 1792-1803. doi:10.1037/a0025309
- Stevens, E. A., & Prinstein, M. J. (2005). Peer contagion of depressogenic attributional styles among adolescents: A longitudinal study. *Journal of Abnormal Clinical Psychology*, 33(1), 25-37.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Taylor, D. C., Szatmari P., Boyle, M.H., & Offord, D. R. (1996). Somatization and the vocabulary of everyday bodily experiences and concerns: A community study of adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 35(4), 491-499.
- Thomsen, A. H., Compas, B. E., Colletti, R. B., Stanger, C., Boyer, M. C., & Konik, B. S. (2002). Parent reports of coping and stress responses in children with recurrent abdominal pain. *Journal of Pediatric Psychology*, 27(3), 215-226. doi:10.1093/jpepsy/27.3.215
- Tompkins, T. L., Hockett, A. R., Abraibesh, N., & Witt, J. L. (2011). A closer look at co-rumination: Gender, coping, peer functioning, and internalizing/externalizing problems. *Journal of Adolescence*, 34(5), 801-811. doi:10.1016/j.adolescence.2011.02.005
- Ubinger, M. E., Handal, P. J., & Massura, C. E. (2013). Adolescent adjustment: the hazards of conflict avoidance and the benefits of conflict resolution. *Psychology*, 4(1), 50-58.
- Uchino, B. N., Cacioppo, J. T., & Kiecolt-Glaser, J. K. (1996). The relationship between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin*, 119(3), 488-531.
- Vitiliano, P. P., Scanlan, J. M., Zhang, J. M. S., Savage, M. V., Hirsch, I. B., & Siegler, I. C. (2002). A path model of chronic stress, the metabolic syndrome, and coronary heart disease. *Psychosomatic Medicine*, 64(3), 418-435.
- Verkuil, B., Brosschot, J. F., Gebhardt, W. A., & Thayer, J. F. (2010). When worries make you sick: A review of perseverative cognition, the default stress response and somatic health. *Journal of Experimental Psychology*, 1(1), 87-118. doi:10.5127/jep.009110

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- Vernberg, E. M., Nelson, T. D., Fonagy, P., & Twemlow, S. W. (2011). Victimization, aggression, and visits to the school nurse for somatic complaints, illnesses, and physical injuries. *Pediatrics*, 127(5), 842-848. doi:10.1542/peds.2009-3415
- Vervoort, T., Liesbet, G., Eccleston, C., Bijttebier, P., & Crombez, G. (2006). Catastrophic thinking about pain is independently associated with pain severity, disability, and somatic complaints in school children and children with chronic pain. *Journal of Pediatric Psychology*, 31(7), 674-683.
- Vitaro, F., Boivin, M., & Bukowski, W. M. (2009). The role of friendship in child and adolescent psychosocial development. In Rubin, K. H. & Bukowski, W. M. (Eds.), *Handbook of Peer Interactions, Relationships, and Groups* (568-585). New York: Guilford Press.
- Wangby, M. (2000). Somatic complaints in girls: A longitudinal perspective. *Scandinavian Journal of Behavior Therapy*, 29(1), 22-36.
- Wasserstein, S. B., & La Greca, A. (1996). Can peer support buffer against behavioral consequences of parental discord? *Journal of Clinical Child Psychology*, 25(2), 177-182.
- Windle, M. (1992). A longitudinal study of stress buffering for adolescent problem behaviors. *Developmental Psychology*, 28(3), 522-530. doi:10.1037/0012-1649.23.3.522
- Wingenfeld, K., Heim, C., Schmidt, I., Wagner, D., Meinlschmidt, G., & Hellhammer, D. H. (2008). HPA axis reactivity and lymphocyte glucocorticoid sensitivity in fibromyalgia syndrome and chronic pelvic pain. *Psychosomatic Medicine*, 70(1), 65-72.  
doi:10.1097/PSY.0b013e31815ff3ce

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

- White, K. S., & Farrell, A. D. (2006). Anxiety and psychosocial stress as predictors of headache and abdominal pain in urban early adolescents. *Journal of Pediatric Psychology*, 31(6), 582-596. doi:10.1093/jpepsy/jsj050
- Zeman, J., & Garber, J. (1996). Display rules for anger, sadness, and pain: It depends on who is watching. *Child Development*, 67(3), 957-973. doi:10.1111/1467-8624.ep9704150177
- Zeman, J., & Shipman, J. (1996). Children's expression of negative affect: Reasons and methods. *Developmental Psychology*, 32(5), 842-849. doi:10.1037/0012-1649.32.5.842
- Zeman, J., & Shipman, J. (1997). Social-contextual influences on expectancies for managing anger and sadness: The transition from middle childhood to adolescence. *Developmental Psychology*, 33(6), 917-924. doi:10.1037/0012-1649.33.6.917
- Zeman, J., Cassano, M., Perry-Parrish, C., Stegall, S. (2006). Emotion regulation in children and adolescents. *Journal of Developmental & Behavioral Pediatrics*, 27(2), 155-168.
- Zoccola, P. M., & Dickerson, S. S. (2012). Assessing the relationship between rumination and cortisol: A review. *Journal of Psychosomatic Research*, 73(1), 1-9.  
doi:101016/j.jpsychores.2012.03.007



## Appendices

### Appendix 1

*Global coding: Assigning global codes* (Rose et al., 2006)

The following four aspects of co-rumination were coded using the following 5-point Likert scale:

- 1: Not at all / very little
- 2: A little
- 3: A moderate amount
- 4: A lot
- 5: Very much

1) Mutual encouragement of problem talk : One or both members of the dyad keeps the problem talk going instead of talking about other issues. One or both may also try to the other to talk about the problem again after the topic has been switched.

Alice: We have been talking about this forever! Oh well, it's okay.

Jane: I know; it's important. So what happened with [the problem] yesterday?

2) Rehashing problems : One or both members of the dyad talks about the problems or parts of the problems over and over again.

Daniel: I mean I know I've said this already, but she freaking *stole* his wallet!!

Josh: Right, dude. She freaking stole it. And remember how she said she didn't do it?

3) Speculating about problems : One or both members of the dyad ponders the origins of the problem or parts of the problem, why people did what they did, what may happen as a result, etc.

Jennifer: Why do you think he did that? He can't be that mean.

Sarah: I don't know. I mean, maybe he was having a bad day?

4) Dwelling on negative affect : One or both members of the dyad focuses on the experience of negative emotions like feeling worried, nervous, irritated, sad, anxious, angry, depressed, low, scared, distressed, anguished, shameful, embarrassed, frustrated, etc.

Bill: It sucks man. It really sucks.

Henry: Seriously. You must feel like crap.

### General Score

Additionally, a single co-rumination score was assigned to each dyad using the same Likert scale listed above. This score reflected the coder's general sense of the combination of the four aspect scores and also took into account the total time spent talking about problems.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Table 1  
*Factor Analytic Structure of Somatic Complaints Scales*

Item	Factor		
	1	2	3
	Overweight & Inactivity	Gastrointestinal Distress	Fatigue & Aches
<i>Mother-Report (CBCL)</i>			
55. Overweight	<b>.888</b>	.063	-.138
53. Overeating	<b>.808</b>	.007	.207
102. Underactive, slow moving, or lacks energy	<b>.508</b>	-.052	-.101
56f. Stomach aches	-.018	<b>.827</b>	-.149
56c. Nausea	-.053	<b>.563</b>	.227
56g. Vomiting, throwing up	.081	<b>.475</b>	-.012
77. Sleeps more than most kids during day or night	-.023	-.026	<b>.603</b>
54. Overtired without reason	.134	.008	<b>.475</b>
24. Doesn't eat well	-.088	.003	<b>.411</b>
51. Feels dizzy or lightheaded	-.175	.089	<b>.355</b>
56a. Aches or pains (not stomach or headaches)	.005	-.072	<b>.308</b>
Item	1	2	3
	Nausea & Dizziness	Aches & Pains	Fatigue
<i>Child-Report (CDI; MASC)</i>			
MASC 4. I get dizzy or faint feelings	<b>.758</b>	.179	.257
MASC 6. I feel sick to my stomach	<b>.606</b>	.323	.231
CDI 19. I worry about aches and pains all the time	.233	<b>.692</b>	.113
CDI 17. I am tired all the time	.201	.104	<b>.524</b>
CDI 16. I have trouble sleeping many nights	.279	.085	<b>.428</b>
CDI 18. Many days I do not feel like eating.	.077	.047	<b>.410</b>

*Note.* Maximum likelihood extraction with oblique rotation via Direct Oblimin.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Table 2  
*Means, Standard Deviations, and Gender Differences*

Variable	<u>Boys</u> <i>M (SD)</i>	<u>Girls</u> <i>M (SD)</i>	<u>Total</u> <i>M (SD)</i>	<i>t</i> -value ( <i>df</i> )
Age (months)	152.84 (13.50)	151.07 (11.14)	151.9 (12.29)	-1.02 (198)
Depressive Symptoms	6.06 (5.18)	6.72 (5.73)	6.41 (5.48)	0.83 (198)
Anxiety Symptoms	9.71 (4.54)	11.59 (4.24)	10.71 (4.47)	3.03 (198)**
Child-Reported Somatic Symptoms	2.80 (1.89)	3.33 (2.58)	3.08 (2.28)	1.60 (198)
Mother-Reported Somatic Symptoms	1.38 (1.83)	1.27 (1.82)	1.32 (1.82)	-0.38 (161)
Friendship Quality	54.69 (11.16)	61.72 (9.45)	58.40 (10.85)	4.79 (195)***
Emotional Support	86.36 (16.92)	97.25 (13.17)	92.14 (15.96)	5.10 (198)***
Emotional Non-Support	42.82 (12.22)	38.75 (9.25)	40.66 (10.91)	-2.68 (198)**
Observed Co-Rumination	1.94 (0.78)	2.54 (0.92)	2.27 (0.91)	4.71 (172)***
Perceived Co-Rumination	67.65 (24.80)	82.84 (21.18)	75.67 (24.13)	4.64 (195)***
Prosocial Behavior	17.70 (3.17)	19.66 (3.23)	18.74 (3.34)	4.31 (197)***
Overt Victimization	5.10 (1.98)	4.27 (1.85)	4.66 (1.96)	-3.03 (198)***
Relational Victimization	9.33 (3.36)	9.33 (3.87)	9.33 (3.63)	0.01 (198)

*Note.* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Table 3

*Bivariate Correlations Between Friendship, Victimization, Emotional Expression, and Somatization*

Variable	1	2	3	4	5	6	7	8	9	10	11
<i>Somatization</i>											
1) Child-Reported	-										
2) Mother-Reported	-.14	-									
<i>Internalizing</i>											
3) Depression Symptoms	.50***	.08	-								
4) Anxiety Symptoms	.39***	.01	.30***	-							
<i>Victimization</i>											
5) Overt	.25***	-.08	.27***	.15*	-						
6) Relational	.34***	-.01	.39***	.22**	.42***	-					
<i>Emotion Talk</i>											
7) Unsupportive	.18*	.01	.22**	.01	.22**	.09	-				
8) Supportive	-.16*	.07	-.16*	.13	-.05	-.01	-.49***	-			
<i>Co-Rumination</i>											
9) Observed	.09	.04	-.02	.21**	-.20**	.11	-.19*	.22**	-		
10) Perceived	.08	.07	.03	.19*	.04	.11	-.22**	.54***	.10	-	
<i>Best Friendship</i>											
11) Friendship Quality	-.08	-.02	-.23**	.06	-.11	-.05	-.42***	.60***	.28***	.52***	-

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Table 4  
*Gender Moderation of Overt Victimization and Somatic Symptoms*

Variable	<i>B</i>	<i>SE B</i>	$\beta$
<i>Step One (control variables)</i>			
Depressive Symptoms	.403	0.06	.408***
Anxiety Symptoms	.249	0.06	.253***
<i>Step Two (main effects)</i>			
Gender	-.153	0.12	-.077
Overt Victimization	.309	0.08	.318***
<i>Step Three (interaction)</i>			
Gender x Overt	-.403	0.12	-.290***
$R^2$		0.369***	
$F$ for change in $R^2$		11.688***	

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .001$

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

Table 5  
*Gender Moderation of Relational Victimization and Somatic Symptoms*

Variable	<i>B</i>	<i>SE B</i>	$\beta$
<i>Step One (control variables)</i>			
Depressive Symptoms	.344	0.07	.348***
Anxiety Symptoms	.239	0.06	.243***
<i>Step Two (main effects)</i>			
Gender	-.138	0.12	-.070
Relational Victimization	.277	0.08	.280***
<i>Step Three (interaction)</i>			
Gender x Relational	-.265	0.12	-.171*
$R^2$		0.357*	
$F$ for change in $R^2$		4.833*	
<i>Note. * <math>p &lt; .05</math>, ** <math>p &lt; .01</math>, *** <math>p &lt; .001</math></i>			

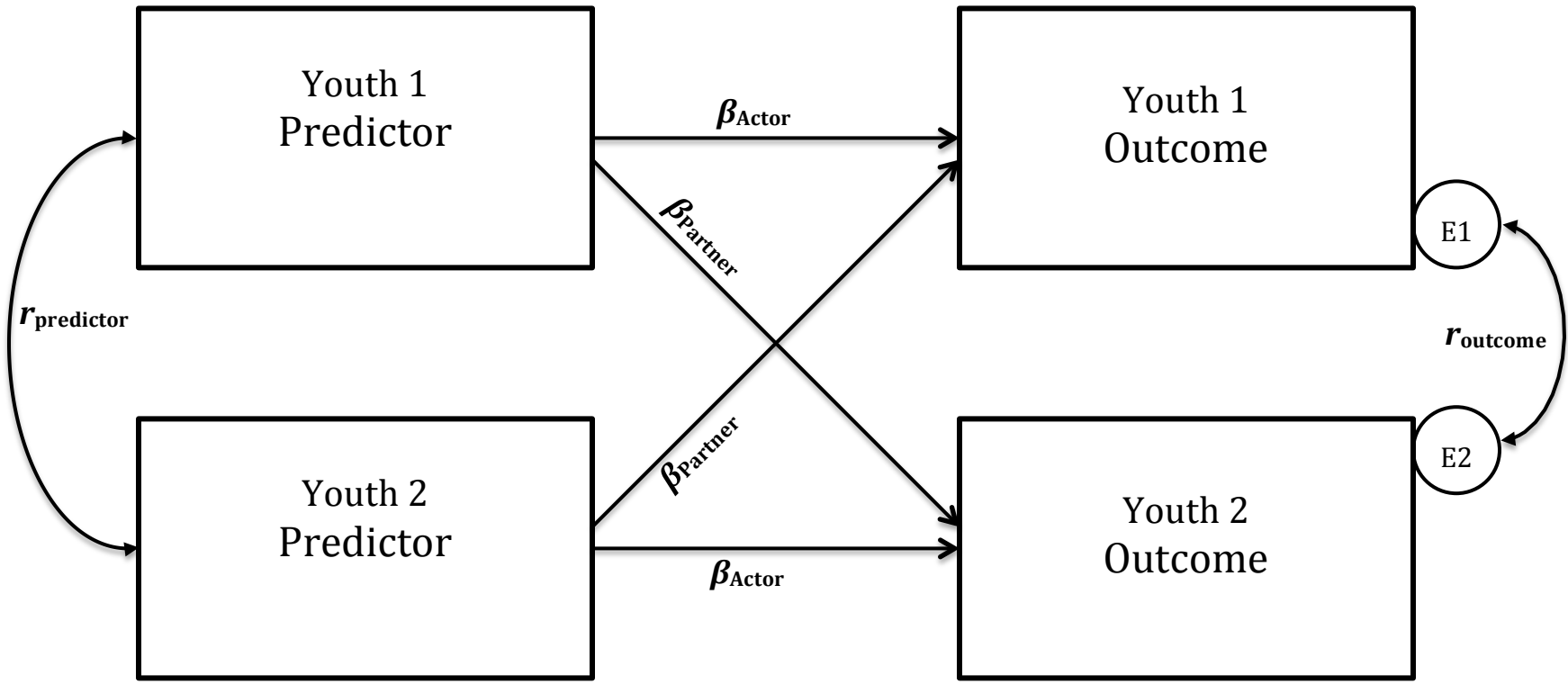


Figure 1. An example actor-partner interdependence model for indistinguishable dyads.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

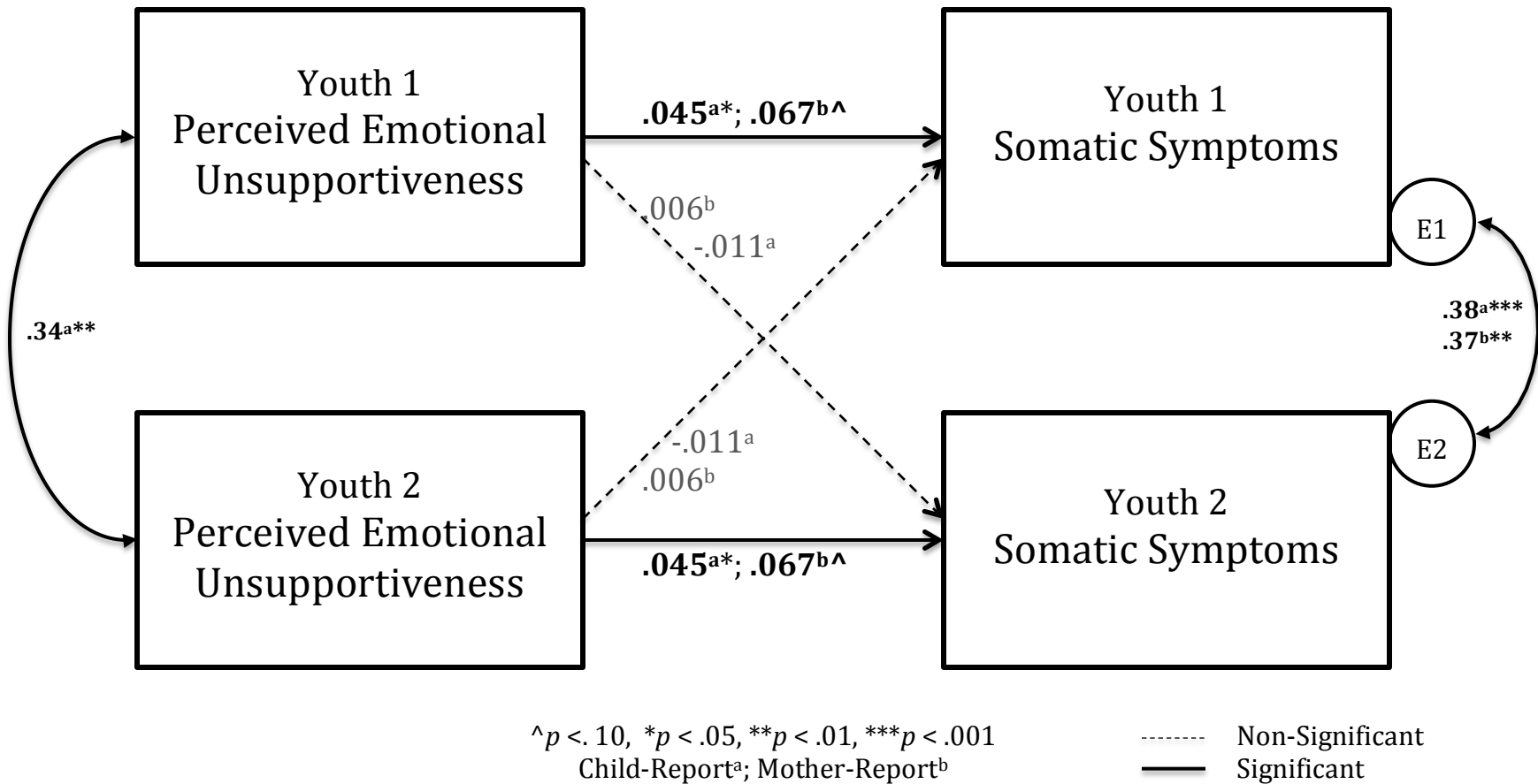


Figure 2. Actor effect of perceived emotional unsupportiveness on child- and mother-reported somatic symptoms. Gender, anxiety symptoms, and depressive symptoms were entered as covariates (*not shown*).



## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

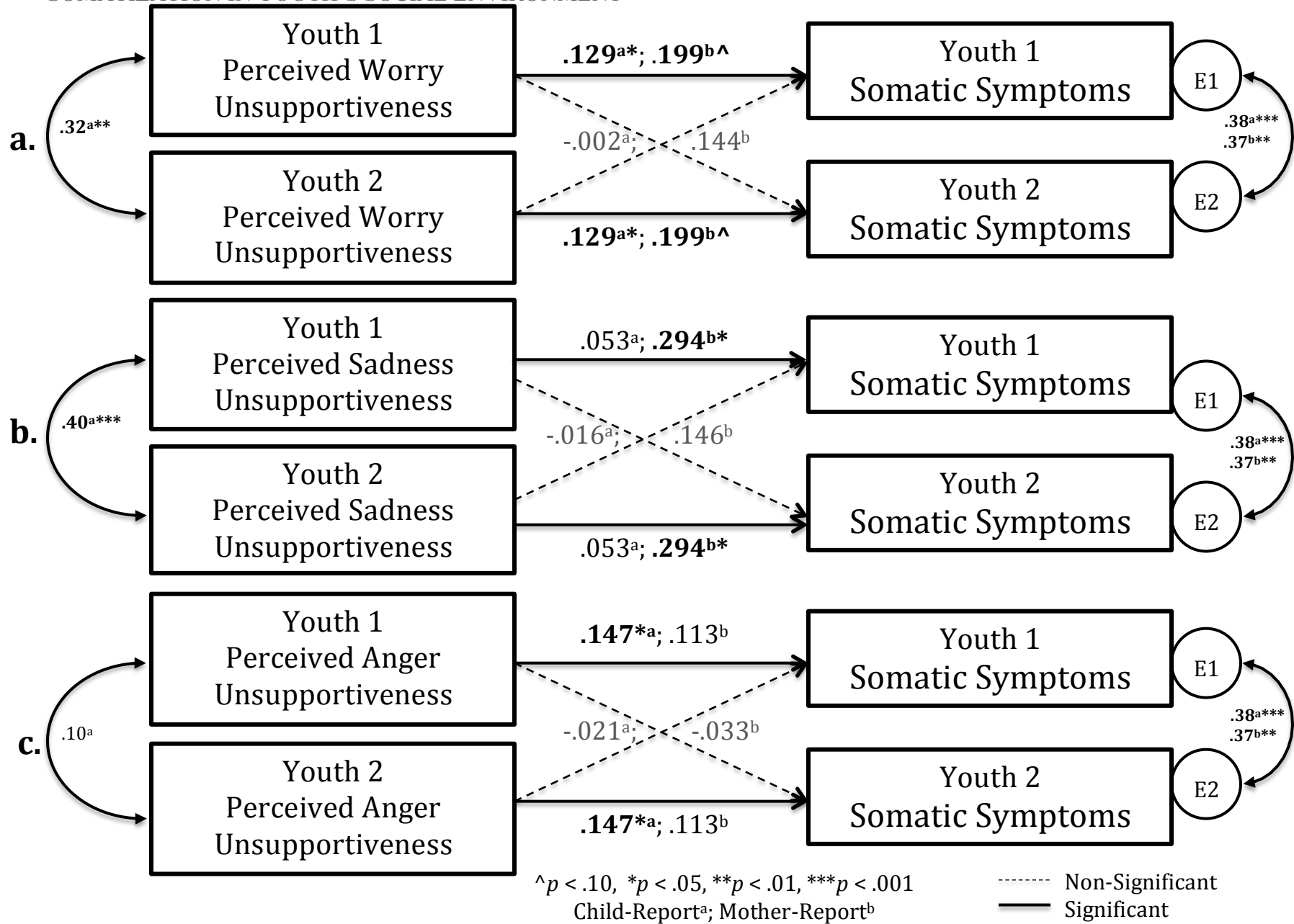


Figure 3. Actor effect of perceived emotional unsupportiveness on child- and mother-reported somatic symptoms. Gender, anxiety symptoms, and depressive symptoms were entered as covariates (*not shown*).

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

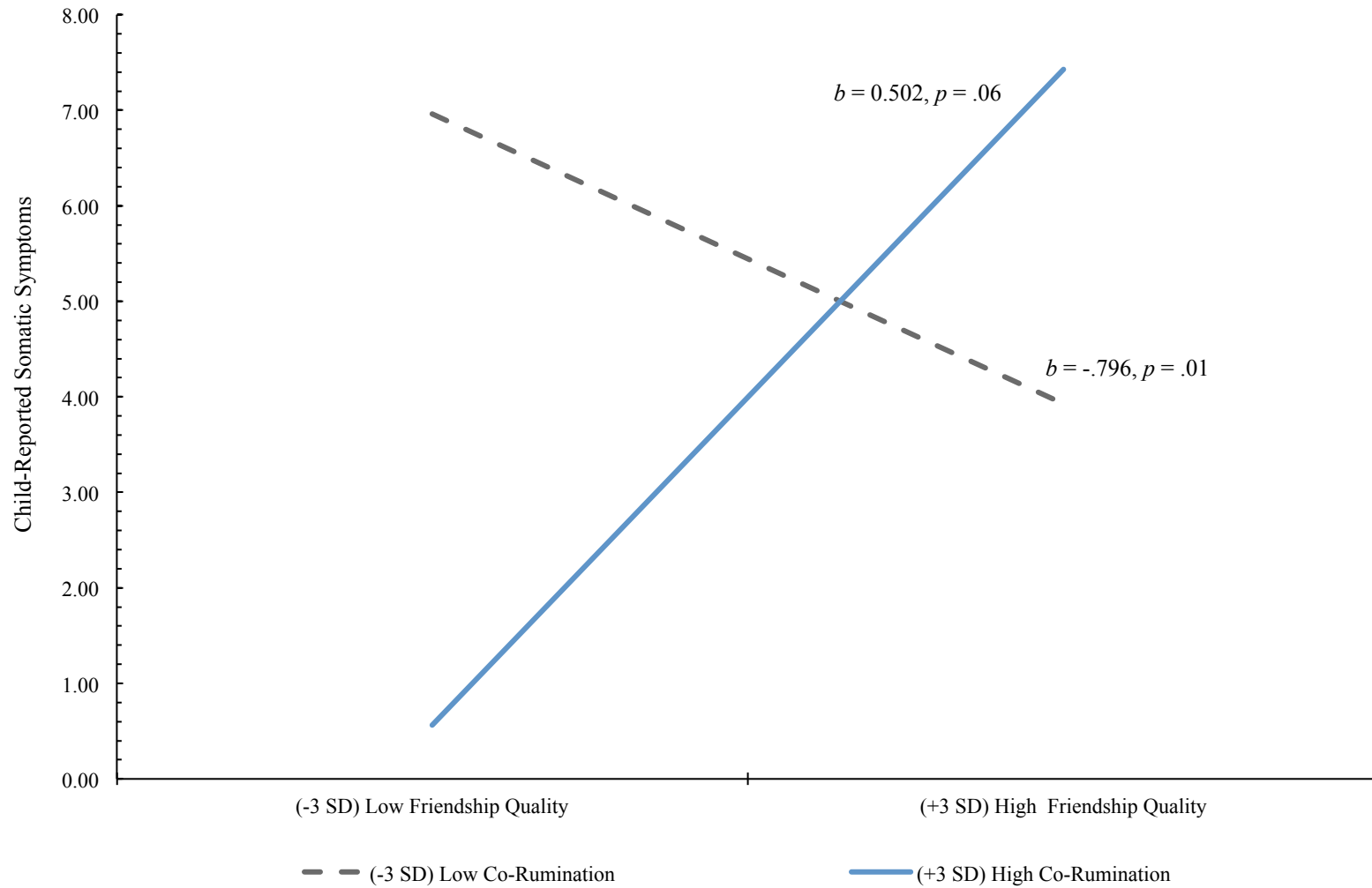


Figure 4. Partner interaction of co-rumination and friendship quality on child-reported somatic symptoms.

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

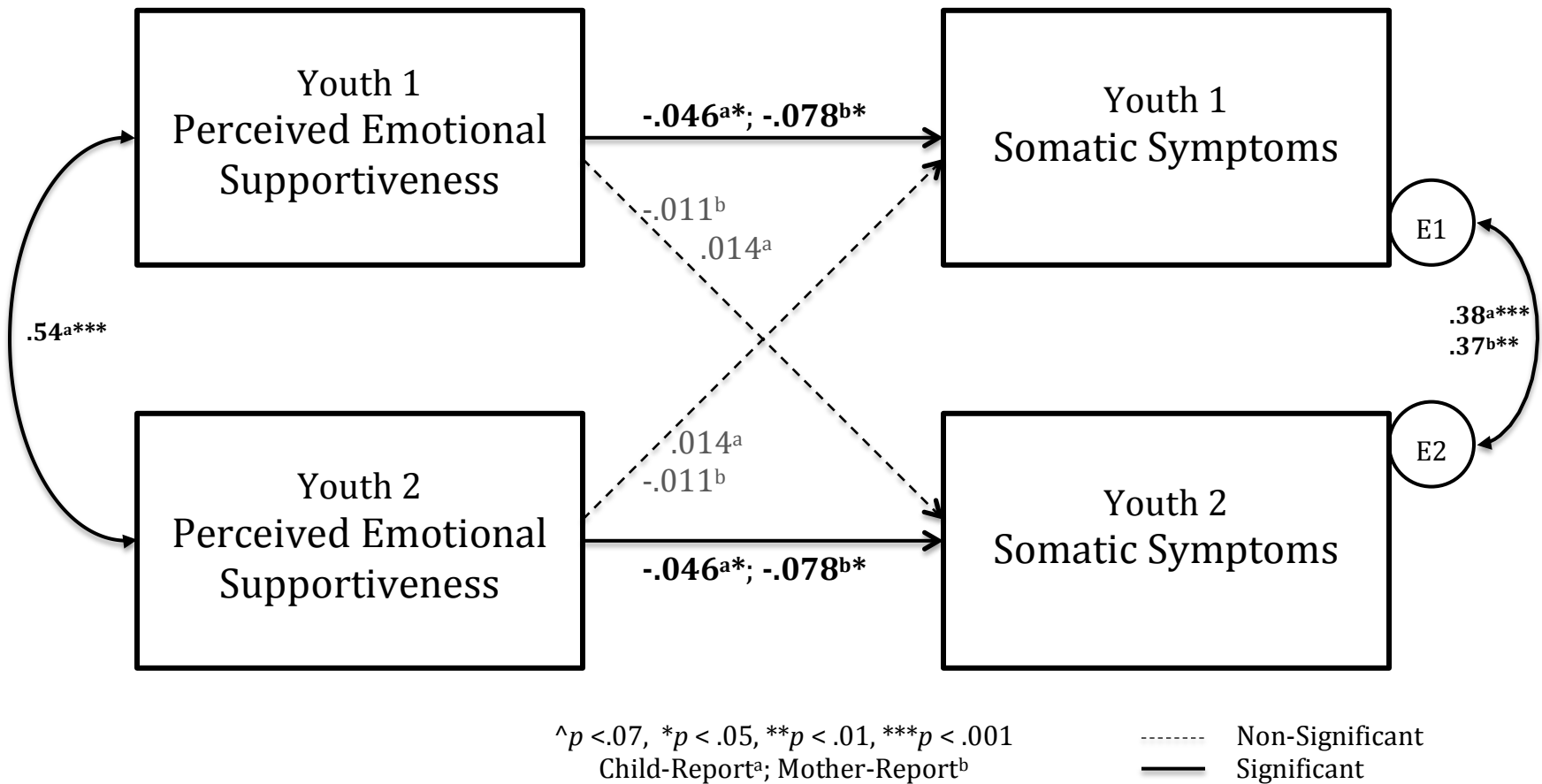


Figure 5. Actor effect of perceived emotional supportiveness on child- and mother-reported somatic symptoms. Gender, anxiety symptoms, and depressive symptoms were entered as covariates (*not shown*).

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

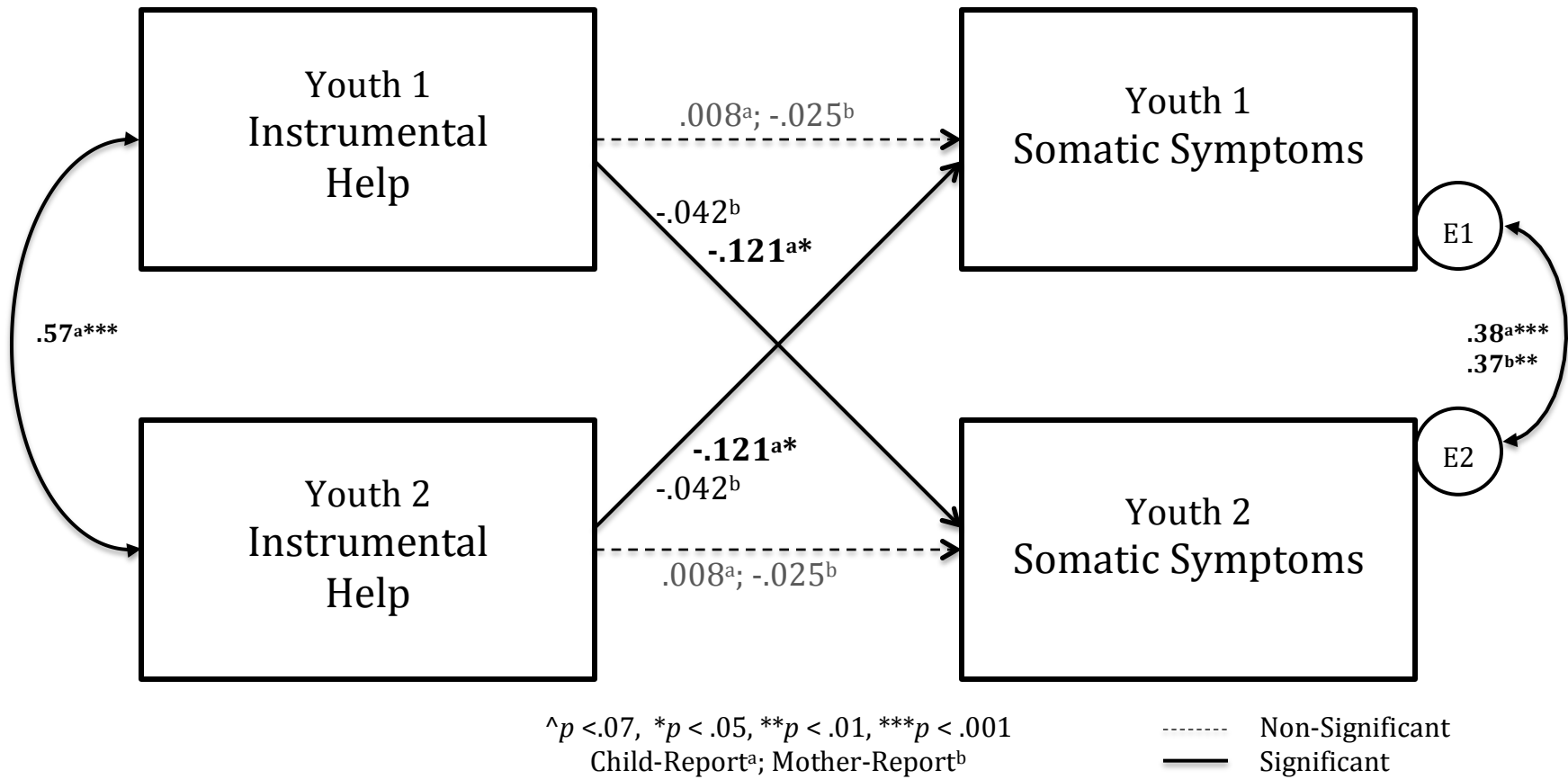


Figure 6. Partner effect of instrumental help on child-reported somatic symptoms. Gender, anxiety symptoms, and depressive symptoms were entered as covariates (*not shown*).

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

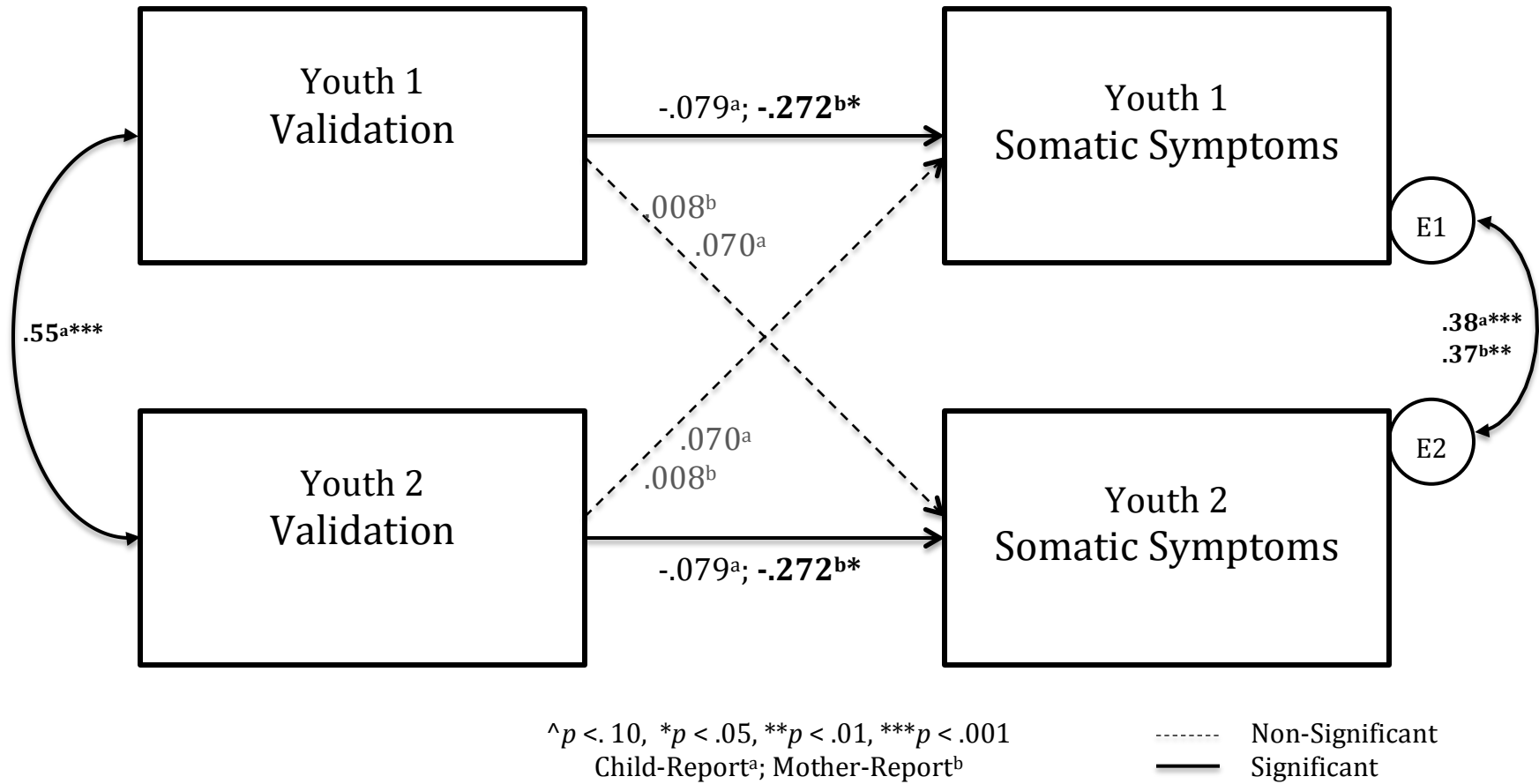


Figure 7. Actor effect of validation on mother-reported somatic symptoms. Gender, anxiety symptoms, and depressive symptoms were entered as covariates (*not shown*).

## SOMATIZATION IN YOUTH'S SOCIAL ENVIRONMENT

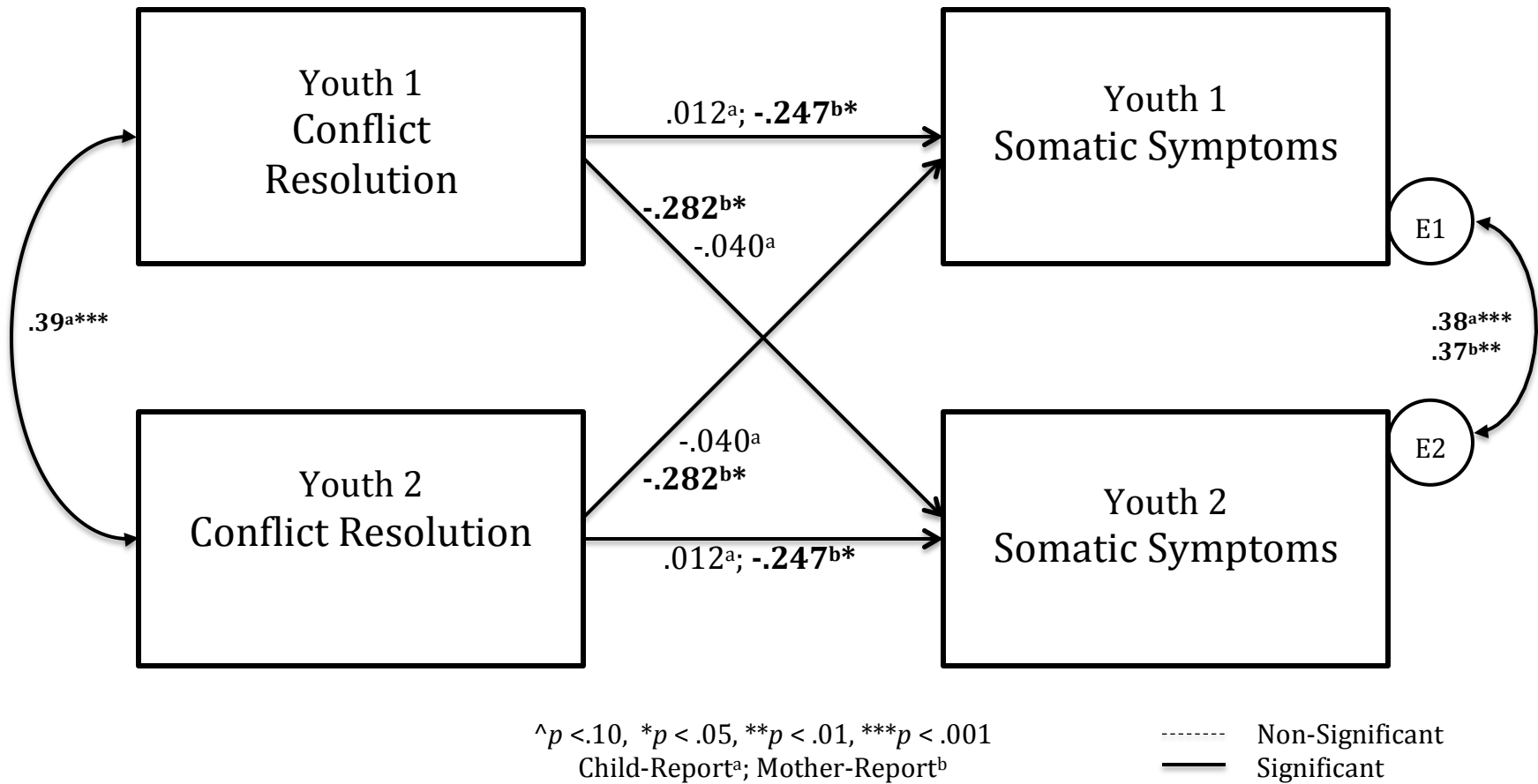


Figure 8a. Actor and partner effects of conflict resolution on mother-reported somatic symptoms. Gender, anxiety symptoms, and depressive symptoms were entered as covariates (*not shown*).

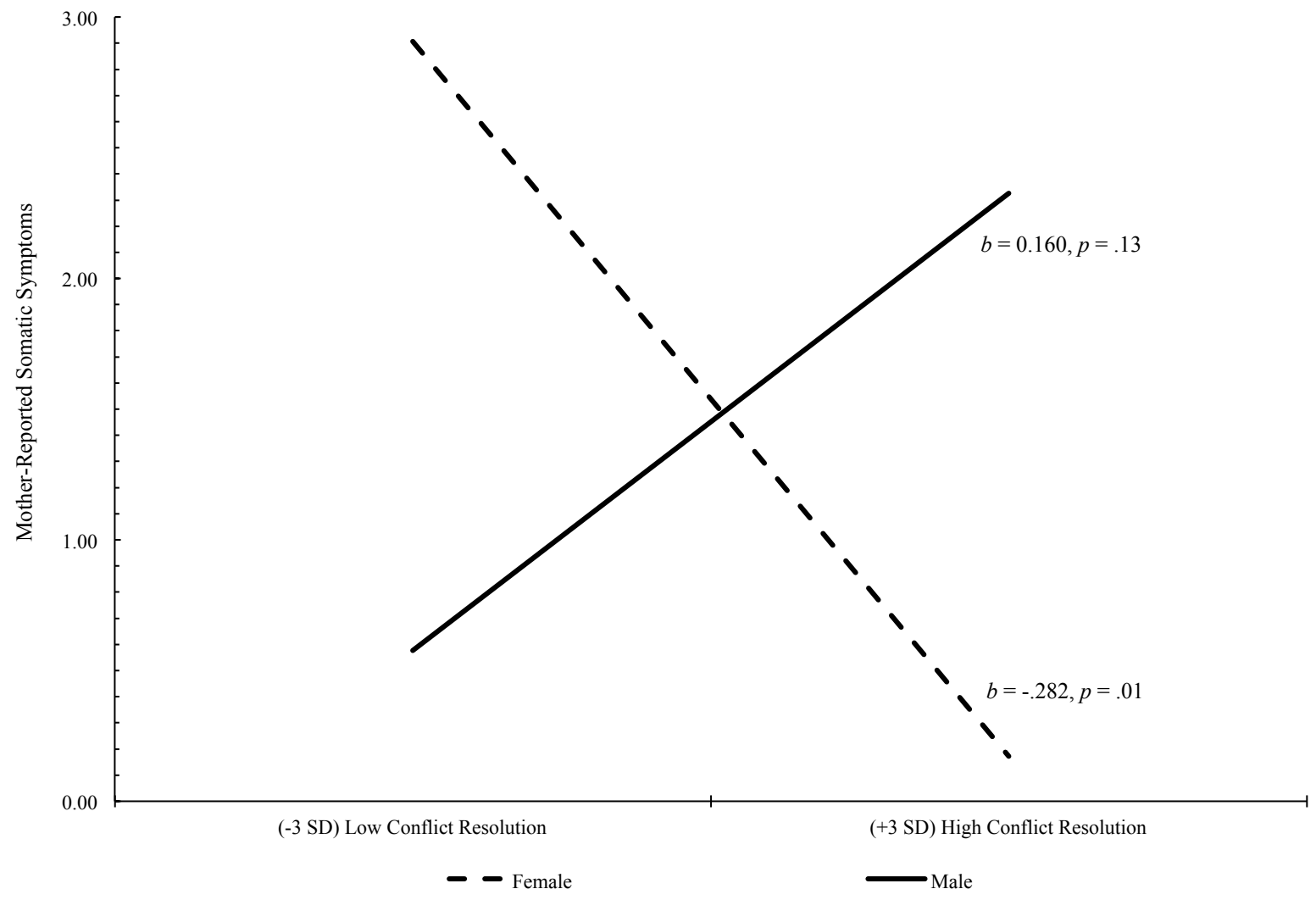


Figure 8b. Gender moderation of conflict resolution partner effect on mother-reported somatic symptoms.